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DISEASES CAUSED BY BACTERIA AND FUNGI.

WOOLSEY, C. I. (1931). **The Diagnosis of Tuberculosis.**—*J. Infect. Dis.* **49.** 177-182. 3 tables. [1 ref.]

The value of HERROLD's egg yolk agar (one yolk added to 200 c.c. of 1·5 per cent. agar at 60° C.) for the isolation of tubercle bacilli from suspected material was compared with guinea pig inoculation. The results of the cultures agreed with the guinea pig test in 121 of 130 samples examined : in five of the nine cases in which disagreement was registered, the cultures were the more reliable. As it was possible to detect a visible growth on this medium in an average time of 12 to 13 days, the results were known at least one month before those of the guinea pig tests were available. It is noted that freshly aspirated exudates, such as pleural fluids, which rapidly coagulate may occasionally give negative guinea pig results unless clotting is previously prevented by the addition of 20 per cent. sodium citrate solution. This precaution is unnecessary with the egg medium.

R. E. GLOVER.

GRÄUB, E. (1931). Über die Bekämpfung der Tuberkulose unter den Rindern. **[On the Control of Bovine Tuberculosis].**—*Schweiz. Arch. Tierhlk.* **73.** 331-363. [12 refs.]

The author compares the Bang Method, the Ostertag Method and the American Accredited Herd and Area Plan for the control of bovine tuberculosis.

He quotes a good deal of statistical evidence relating to the value of these methods and describes at length a scheme, which he believes will be the most suitable for the conditions prevailing in Switzerland, based on three main requirements :—

(1). The prevention of infection by contact in a herd already partially infected.

(2). The raising of calves to form a tuberculosis-free herd.

(3). The protection of farms from possible infection by the addition of fresh animals.

J. T. E.

FAGOT, V. (1931). La lutte contre la tuberculose bovine en Belgique. Premiers essais d'application du nouveau programme. [**The Campaign against Bovine Tuberculosis in Belgium. The First Stages in the Application of the new Programme**].—*Bull. Off. internat. Epiz.* **5.** 416-440. 3 tables.

This report, which has been revised for purposes of publication, was originally presented to the National Milk Society, Belgium, on May 20th, 1931. It describes in some detail the first efforts made in the application of a programme which was initiated in July, 1927.

The author gives the details of the programme adopted, such as the position of the purchaser, the protection of the vendor and the grant of certain pecuniary aids. Various tables indicate the extent of the disease in 4,050 of the byres which have been inspected. Results obtained from annual retesting are discussed. The author states that the presentation of certificates of health (some 367 have already been awarded) acts as a stimulus to other owners, more especially as the names and addresses of successful claimants are published both in agricultural and in lay journals.

The testing of purchased animals, the isolation of calves and the elimination of animals suffering from " open " tuberculosis are all described, as is, even more fully, the improvement in supervision and general hygiene, which has occurred as the result of the scheme, in animals reacting to the tuberculin test, but not suffering from clinical disease.

G. W. DUNKIN.

BALOZET, L. (1931). Effets des réinoculations successives de BCG chez le cobaye. [**The Effects of Repeated Injections of BCG on the Guinea Pig**].—*Ann. Inst. Pasteur.* **46.** 604-615. [9 refs.]

Successive inoculations, with living or dead bacteria, into animals which are in a condition of latent infection—naturally or artificially produced—generally result in the formation of focal lesions of reactivation which may become sufficiently serious to cause death.

The author attempted to exalt the virulence of BCG by repeated inoculations into guinea pigs.

It is acknowledged that intraperitoneal and intravenous injections of BCG may cause nodular lesions in the viscera or on the serous membranes. These nodules are absorbed and the animal's health does not suffer in any way.

Five series of experiments were carried out, as follows :—

(1) Intracardial inoculations followed by re-inoculations by the same route.

It was found that weekly intracardial inoculations produced marked loss of weight in the six guinea pigs used. The intervals between doses were, therefore, increased to two or three weeks. Wasting then stopped. Death resulted after three to eight injections of 5 mg. doses. Insignificant tuberculous lesions were found, but death could not be attributed to them. The lesions appeared to be as severe after three or four injections as after seven or eight. In every case, guinea pigs died on the day of an inoculation, or on the day following, and death appeared to be due to a toxic action.

(2) Intraperitoneal inoculations followed by re-inoculations by the same route.

Three guinea pigs, subjected to repeated intraperitoneal inoculations with 5 mg. doses, survived for 43 to 64 days. *Post-mortem* examination revealed the presence of peritonitis characterised by adhesions and the bacilli were "encysted" in nodules with caseous centres. Although the lesions were widespread, there was no extension of the disease to the substance of the organs or to the pleural cavity. When injected into other guinea pigs, the bacilli did not produce recognisable lesions.

(3) Subcutaneous inoculations followed by re-inoculations by the same route.

Three guinea pigs were subjected to repeated subcutaneous injections, an interval of one week elapsing between the doses in most cases. The first injections produced abscesses which burst in three or four weeks. Abscesses resulting from subsequent injections burst within a week and were healed a week later ; ulceration never occurred. Injections did not produce any evidence of reaction at the sites of previous inoculations.

The three guinea pigs were killed a fortnight after the twenty-third inoculation. It was anticipated that the subcutaneous tissue would show fibrous nodules where the inoculations had been given ; this, however, was not the case. No trace could be found of the site of any inoculation prior to the eighteenth. The viscera were completely free from lesions, but all the lymphatic glands were enlarged.

(4) Intracardial inoculations followed by weekly subcutaneous inoculations.

Two groups of six guinea pigs were used : one group received 10 mg. doses intracardially, followed by weekly subcutaneous injections of 5 mg. ; the other group which received only the first intracardial injection served as controls. After an initial fall, the weight of all the animals increased during the whole course of the experiment (167 days). The two batches of guinea pigs were finally killed and none of them showed any lesions.

(5) Intraperitoneal inoculations followed by weekly subcutaneous inoculations.

This series was parallel with the previous one, except that the first injection was given intraperitoneally. One guinea pig, which had wasted considerably, died three weeks after the first inoculation ; the remainder were killed after 167 days : none of those which had received the subcutaneous injections showed any lesions at all, but four of the controls showed peritoneal lesions.

In the author's opinion, his experiments proved that BCG is non-pathogenic for the guinea pig.

A. LESLIE SHEATHER.

PUNTONI, V. (1931). Contamination causée par des Acariens et simulant un retour du BCG à la virulence. **[Contamination carried by Acarids simulating a Restoration of Virulence to Cultures of BCG].**—*C.R. Soc. Biol. Paris.* **107.** 659-660.

The author records that, in a cabinet containing BCG cultures and virulent cultures of tubercle bacilli and cultures of moulds contaminated by acarids (*Tarsonemus*), the acarids migrated through the plugs from tube to tube and contaminated the BCG cultures from the virulent strains of *B. tuberculosis*.

T. M. DOYLE.

HEELSBERGEN, T. van. (1931). **Are Hens Susceptible to Infection with the Bacillus**

of Johne's Disease (Para-Tuberculosis)?—*J. Comp. Path. & Therap.* **44.** 213-215.

This is the result of a series of experiments carried out to ascertain whether hens are susceptible to Johne's disease, the experiments being based on the work of several investigators who state that cattle affected with this disease generally give a good reaction with avian tuberculin.

The comparative morphology of the bacilli of avian tuberculosis and of Johne's disease is touched upon and the pathogenicity of the two organisms is briefly described.

In the first experiment, crushed tuberculous liver from a hen was added to the food, the dosage being repeated three times. The test hens were killed eight months after infection and the visceral contents and bone-marrow were examined. Three of the fifteen hens showed no evidence of infection.

In the second experiment, a culture of the bacillus of Johne's disease was added to the crushed intestines from bovines suffering from the disease and was fed to thirteen hens. Three other hens were inoculated subcutaneously and one intravenously with cultures of the bacillus. Seven months later all the hens were killed; apart from a slight enteritis caused by parasites, there was a complete absence of infection by the bacillus of Johne's disease. This opinion was confirmed by microscopical examination of sections.

The author concludes with the suggestion that young birds may possibly be susceptible and proposes to repeat the experiments.

G. W. DUNKIN.

COOPER, Hugh, & SCRINIVASAN, M. K. (1931). **The Diagnosis of Johne's Disease. Some Experimental Results using a " Bowel-Washing " Method.** —*Ind. J. Vet. Sci.* **1.** 215-220. 2 tables.

References are made to the use of avian tuberculin and of the double intradermal Johnin tests as methods of diagnosis. Both tests have been used simultaneously with good results, but the authors prefer avian tubeiculin. Good results were obtained by the use of this agent on 11 animals, all of which gave positive reactions, although examination of rectal smears failed to show the presence of acid-fast organisms. When the " bowel-washing " method was used, however, [first described by KRISHNAMURTI (1929). *Proc. Ind. Sci. Congr., Madras*] positive results were obtained in all cases.

The method there described is as follows :—rectal contents are removed by hand and a long rubber tube is introduced as far into the bowel as possible, the bowel being irrigated by enema until water escapes from the rectum. During this process, the mucous membrane of the rectum is washed with the palm of the hand. The escaping fluid is allowed to sediment for a few hours and a few c.c. of supernatant fluid, which is drained off, is collected, mixed with the sediment and centrifuged. Smears are then made from the topmost layers and are examined for the presence of the organism. Providing that the washing process has been effectively carried out, the authors state that this process is ideally suited for the purpose of diagnosis.

G. W. DUNKIN.

MAILLAND. (1931). Contribution à l'étude de la lymphangite ulcéreuse du cheval. **[Contribution to the Study of Ulcerative Lymphangitis of the Horse]**.—*Rev. vét. milit.* **15.** 202-238.

Ulcerative lymphangitis became of serious importance during the Great War, but it has been rare during the last few years. The author gives a general account of the Preisz-Nocard bacillus and of the disease. He then gives in detail his observations on an outbreak among a small group of cavalry horses.

He concludes that the average period of incubation is about 40 days. In view of the similarity between the Preisz-Nocard bacillus and *Corynebacterium diphtheriæ*, the Schick test was carried out on 141 animals in an attempt to pick out those which were particularly susceptible to infection, but it was found to be of no value. Finally, he gives detailed accounts of the various methods of treatment which he employed, including the use of anti-diphtheritic serum, anti-gangrene serum (i.e. anti-*B. perfringens*, anti-*Vibrion septique* and anti-*B. histolyticus* sera combined), and specific vaccines killed by heat or by formol. He concludes :— (1) that anti-gangrene serum is of no value in the treatment of this disease ; (2) that the value of anti-diphtheritic serum cannot definitely be estimated as it probably acts by producing a protein shock, and (3) that the use of specific vaccines which produced 66 per cent. of cures in his hands may give a higher percentage of success after further experience with them has been obtained.

N. BARRON.

KARSTEN. (1931). Ueber die Feststellung des seuchenhaften Verkalbens durch den Nachweis von Agglutininen und Komplementablenkenden Ambozeptoren in Milchserum der Kühe. **[The Recognition of Contagious Abortion by the Demonstration of Agglutinins and Complement-fixing Amboceptors in the Milk Serum of the Cow].**—*Deuts. tierärztl. Wschr.* **39.** 561-567. 7 tables. [15 refs.]

The author deals at very considerable length with the literature on the use of whey for the purpose of diagnosing contagious abortion. He finds that agglutinins and complement-fixing antibodies are present in the whey which, according to his figures, was negative in two instances out of 31 when serum was positive. Generally speaking, it would appear from his results that the amount of antibody in serum is about ten times as large as the amount of antibody in whey.

A. LESLIE SHEATHER.

BENNETTS, H. W., & FILMER, J. F. (1931). **A Note on the Association of Bacillus abortus with Suppurations in the Horse.**—*Austral. Vet. J.* **7.** 74-75.

The authors refer to the reports by RINJARD and HILGER [(1928) *Bull. Acad. vét. de France.* **1.** 272], FITCH, DELEZ and BOYD [(1930) *J. Amer. Vet. Med. Ass.* **76.** 17] and of LANDER and HŒDEN [(1930) *Tijidschr. Diergeneesk.* **57.** 15] that the blood serum of a large proportion of horses affected with fistulous withers and " poll evil " gives positive agglutination reactions to *Br. abortus*—frequently in high titre—and that the organism has been isolated from such lesions.

In Western Australia, they found that the blood serum of two horses affected with fistulous withers, reacted at 1 : 100 and 1 : 2,000 respectively to the agglutination test made with " a standard emulsion of *Br. abortus* of bovine origin." Three normal horses and two horses affected with quittor were used as controls ; the blood serum of four of them gave reactions of 1 : 20, whilst the blood serum of the other gave a negative reaction.

The lesion in the horse which reacted at 1 : 100 was of a chronic nature with the usual open sinuses. The lesion in the other horse consisted of swellings which had not opened to the exterior.

W. A. P.

BULLARD, J. F. (1931). **The Results of feeding various Members of the Colon-Typhoid-Enteritidis Group of Organisms to Anemic and Non-Anemic Pigs.**—*J. Amer. Vet. Med. Ass.* **79.** 625-630. 1 table. [7 refs.]

The author has made an attempt to see whether anæmia in pigs is a possible factor responsible for some of the variations in resistance to infection existing in different animals.

Seventy young pigs were used, 54 of which were anæmic. They were divided into groups and were fed with cultures of various members of the Salmonella group and with *Bact. coli.* The animals were tested for agglutinins before feeding and at intervals afterwards. The findings indicate that agglutinins for *Bact. ærtrycke* and *Bact. enteritidis* appeared earlier in the serum of anæmic than in that of non-anæmic pigs, the assumption being that the bacteria may penetrate the intestinal mucosa more easily in the former group. No significant differences were evident in the pigs fed with culture of *Bact. suipestifer.* The results also demonstrated the virulence of the *Bact. suipestifer* culture for the pigs compared with the relative non-pathogenicity of the cultures of *Bact. ærtrycke* and *Bact. enteritidis.* [No details are given regarding dosage of the test cultures, nor the type of agglutinins found in the serum of the animals.]

R. LOVELL.

DAVID, H. (1931). Beitrage zur Typendifferenzierung der Gärtner-bakterien und zum Vorkommen von Gärtner-bakterien in grauen wilden Ratten. **[The Type-Differentiation of Gärtner-bacteria and the Occurrence of Gärtner-Bacteria in Grey Wild Rats].**—*Zlb. Bakt. I.* (*Orig.*). **121.** 442-448. 1 table. [18 refs.]

The author describes experiments which had for their object the differentiation of types of Gärtner's bacillus. Among other methods, passage through rats was tried, but no results of any value were obtained because 20 per cent. of the rats were found to be infected with the Type IV of the bacillus.

A. LESLIE SHEATHER.

KLIGLER, I. J., & OLITZKI, L. (1931). **The Relation of Temperature and Humidity to the Course of a *B. enteritidis* Infection in White Mice.**—*Amer. J. Hyg.* **13.** 349-361. 6 tables, 1 fig. [20 refs.]

Studies on the epidemiology of typhoid fever in Palestine indicated that the seasonal epidemicity could only be accounted for by the assumption that there existed a seasonal variation in the resistance of the host to such an infection. To test this, groups of white mice were taken and subjected to oral infection with measured doses of *Bact. enteritidis* and kept under different conditions of temperature and humidity. These two factors appeared to have a definite influence on the course of the infection which is considered to consist of three stages—the passage of bacteria past the gastric-duodenal barrier, the penetration of the intestinal wall and the localisation and multiplication of the bacteria.

At a high temperature (30° C.) and low relative humidity (35), penetration of bacteria is more rapid, but their development appears to be held in check and the infection clears up rapidly. At a high temperature and high relative humidity (90), penetration is slower, but intensity and duration of infection are greater. It is somewhat similar, though rather more severe, at low temperatures (10-12° C.) and high humidity. The critical factor appears to be a combination of temperature and humidity.

R. LOVELL.

KIESSIG, W. (1931). Zur Diagnose der Streptokokken-Mastitis. [**On the Diagnosis of Streptococcic Mastitis**].—*Deuts. tierärztl. Wschr.* **39.** 570-571. 1 plate. [1 ref.]

GÖTZE, R. (1931). Zur klinischen Diagnostik und Behandlung der Kokkenerkrankungen des Euters. [**On the Clinical Diagnosis and Treatment of Coccal Diseases of the Udder**].—*Berl. tierärztl. Wschr.* **47.** 649-656.

Kiessig does not believe that clinical examination, including the test for salty taste, is sufficient ; moreover, among the so-called rapid methods, the reaction test with brom-thymol-blue and the chemical test for chlorides fail in 25-30 per cent. of cases.

The bacteriological test, including microscopical and cultural examination, is generally necessary ; the clinical history may help in prognosis. Quarter samples are required and 10 c.c. of each are centrifuged at 3,000 revs. p.m. for ten minutes. The normal sediment is a mere white or greyish-white speck. Smears are classified according to the average number of cells per field ($\frac{1}{12}$ inch oil immersion objective), five being regarded as normal and over 40 as definitely pathological, unless of known physiological origin. The cells of healthy and abnormal milk show no qualitative difference. Streptococci may be in pallisade formation, but are often quite rounded ; length of chain is of no prognostic significance ; swollen and badly stained forms are common. Negative findings are of no value.

If the sample is suspect in any way, surface cultures are made on agar. Typical colonies are 1-2 mm. in diameter, greyish blue and matt surfaced with an edge which suggests interwoven locks of hair. Suspected colonies are further tested and must grow in broth with a clear supernatant layer ; they clot litmus milk within 48 hours and do not grow in methylene blue milk unless heavily sown. No β hæmolytic strains have so far been found.

Götze has made a special study of clinical diagnosis and believes that it can be nearly as accurate as the bacteriological when carried out with similar care. He also states that, with experience and sufficient assistance, one man can accurately determine the condition of the udder of 20 to 30 cows within an hour. His methods include palpation of each teat, cystern and gland proper, and examination of the secretion for taste, odour and the presence of flakes or clots, the latter on a shallow, black, unbreakable dish. The rapid catalase test [with hydrogen peroxide] and the reaction test are considered optional.

He believes that severe mastitis may be caused by cocci other than those regarded as the typical " Galt " streptococci (*S. agalactiæ*) and that mastitis should be regarded as a whole quite apart from the cause.

THERAPY.—He believes that control is not a matter of vaccines, but of good milking and general hygiene. Frequent stripping and warm fomentations form the

best treatment. Injections of chemical agents may be helpful, but must be combined with thorough stripping.

The last part of this article consists of a detailed consideration of all the forms of mastitis, arranged under ten headings, ranging from a simple catarrhal condition of the teat and cystern to general catarrh and the parenchymatous condition associated with complete alteration of the character of the secretion and loss of the quarter.

A. W. STABLEFORTH.

MINETT, F. C., STABLEFORTH, A. W., & EDWARDS, S. J. (1931). **The Biology of Streptococcus agalactiæ.**—*Zlb. Bakt. I. (Orig.).* **122.** 466-469. 6 figs. [9 refs.] [A note in reply to criticism by H. HAUPT.]

CONCLUSIONS :—

(1) Streptococci of the *Streptococcus agalactiæ* group do not uniformly show hæmolysis of the alpha or alpha-prime type, in the sense of J. H. BROWN. On the contrary, when growing in blood agar plates, some strains are clearly beta-hæmolytic. [This fact is illustrated by photographs.]

(2) Mastitis may be caused at times by streptococci other than *S. agalactiæ.*

F. C. MINETT.

STARK, C. N., & FOTER, M. J. (1931). **The Characteristics of Organisms Causing Ropy Milk, and the Importance of Feeds as their Source.**—*Cornell Vet.* **21.** 109-113. [7 refs.]

Ropiness in milk is due to post-mammary infection. Over 500 cultures of bacteria found to cause ropy milk have been studied and divided into seven groups ; two of these groups contained gram-negative bacilli and five contained gram-positive staphylococcal types. The authors' investigations show that cow feeds are important sources of these bacteria. Although pasteurisation may kill artificially-grown cultures, the data submitted indicate that in nature these bacteria may be more thermostable ; this may explain cases of ropiness which have been reported following proper pasteurisation of the milk.

NORMAN HOLE.

TUNNICLIFF, Ruth. (1931). **Dissociation of Hæmolytic Streptococci from Erysipelas, Scarlet Fever and Septic Sore Throat.**—*J. Infect. Dis.* **48.** 511-525. 4 figs. [13 refs.]

The author describes cultural tests of hæmolytic streptococci isolated from erysipelas, scarlet fever and septic sore throat, and refers to the results published in a previous paper [(1930). *J. Amer. Med. Ass.* **94.** 1213]. On the so-called chocolate agar (blood agar heated), the strains remain very constant in their cultural and immunological characters. A certain number of strains show dissociation and changes occur in the cultural and immunological characters. By the use of suitable media and by animal passage, many of the dissociated strains can be reverted to the original type.

A. LESLIE SHEATHER.

BEATTIE, W. W. (1931). **An Epizootic produced by a Hæmolytic Streptococcus**

in Laboratory Guinea Pigs with Abscess formation.—*J. Path. & Bact.* **34.** 453-458. 1 table, 1 plate. [4 refs.]

The author describes 16 cases due to streptococci which were morphologically alike. From 11 cases pure cultures were obtained all of which produced β hæmolysis on and in blood agar plates. All fermented lactose and salicin, but not mannite, thus giving the reactions for *S. pyogenes* (Holman, 1916). The most common seat of lesions was the lymph glands, usually those of the neck, but in about half the cases the lungs, and occasionally other organs, were affected. The lesions in the internal organs were often granulomatous in character; abscess formation was common in the glands. Acute and chronic lesions were sometimes found in the same animal.

The disease was reproduced by the subcutaneous inoculation of 0·5 c.c. and 1·0 c.c. of culture and by the intravenous injection of 1·0 c.c. of a saline suspension of pus. In one case, the inoculation was made with a culture which was isolated ten months previously.

Two guinea pigs which were inoculated with *S. pyogenes* did not show any similar disease.

A. W. STABLEFORTH.

STILLMAN, Ernest G., & BRANCH, Arnold. (1931). **Localisation of Pneumococci in the Lungs of Partially Immunised Mice following Inhalation of Pneumococci.**—*J. Exp. Med.* **54.** 623-627. 1 table. [1 ref.]

In the event of infection occurring in animals partially immunised against an organism, such as the pneumococcus, localised lesions are likely to occur, in contrast to the generalised infection set up in the non-protected animal. The authors have demonstrated this reaction by alcoholising mice (by the intraperitoneal injection of alcohol in salt solution) and by exposing them to a pneumococcus culture spray. A certain number of generalised infections occurred in normal mice, in control mice inoculated with normal serum and in mice inoculated with heterologous sera or vaccines, but no evidence of lung localisation was found. In mice protected by homologous sera or vaccines, however, localised lesions in the lungs occurred in an appreciable percentage of the infections.

NORMAN HOLE.

ZOZAYA, J. (1931). **A Serological Study of the Polysaccharides of Meningococcus, *B. anthracis*, *B. proteus*, *B. subtilis* and *B. mesentericus*.**—*J. Exp. Med.* **54.** 725-731. 5 tables. [8 refs.]

Polysaccharides obtained from the meningococcus, *B. anthracis*, *B. proteus*, *B. subtilis* and *B. mesentericus*, have been examined immunologically for any common relationship. The meningococcus polysaccharide reacts with a broad (as regards range of reaction) precipitable, carbohydrate antibody in common with the polysaccharides of the other four organisms. The anthrax and *B. proteus* polysaccharides are specific in higher dilutions of serum. Absorption tests show that anti-anthrax serum contains two different polysaccharide precipitable antibodies, one specific and the other non-specific. These two carbohydrate, precipitable substances have no relation to the agglutinins.

W. R. WOOLDRIDGE.

SHAW, F. W. (1931). **Gelatin Liquefaction by Bacteria (Viscosity-Conductivity Studies).**—*Zlb. Bakt. I.* (*Orig.*). **121.** 481-488. 1 fig., 6 charts, 7 tables. [6 refs.] [In English.]

This paper is of special interest to the biochemist. The author describes an instrument by means of which the viscosity and conductivity of a gelatin medium may be followed from day to day. An account is given of the changes in viscosity-conductivity of gelatin resulting from bacterial action.

A. LESLIE SHEATHER.

ROSENTHAL, L., & LIEBERMAN, H. (1931). **The Rôle of Lysozyme in the Development of the Intestinal Flora of the New-Born Infant.**—*J. Infect. Dis.* **48.** 226-235. 6 tables. [10 refs.]

Human colostrum and milk contain an enzyme, lysozyme, which lyses certain bacteria, especially air-borne invaders of the intestinal tract of new born infants. Cows' milk and cow milk preparations do not contain this enzyme, although it is present in the white of egg, human tears and other fluids and tissues of human beings. Lysozyme is present in the stools of breast-fed infants, but is absent from those fed on cows' milk. With the appearance of lysozyme in the stools, the flora changes from that typical of air-borne organisms to a stable *B. bifidus* flora. Lysozyme does not attack *B. coli* as readily as it does sarcinæ, but it appreciably reduces their numbers, especially if incubated at 56° C. The enzyme has no apparent effect on *B. bifidus*. It is concluded that the lysozyme of mothers' milk is an important factor in the development of the intestinal flora of the breast-fed infant.

W. R. WOOLDRIDGE.

THOMAS, A. (1931). **Actinobacillosis and other Complications in Sheep which may arise from the Feeding of Prickly Pear** (*Opuntia spp.*).—*17th Rep. Direct. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. pp. 215-229. 6 figs. [13 refs.] Pretoria : Govt. Printer.

The author commences by discussing the prevailing views on the danger of the common prickly pear and the utility of spineless varieties as source of fodder during drought. In connection with contemplated introduction of the parasitic *Cactoblastis*, which so successfully destroyed prickly pear in Australia, the Union Department of Agriculture arranged experiments on the value of the possibly useful varieties which might incidentally be exterminated.

The author, as a veterinarian, joins issue with a study of the physiologically injurious effects of the spiculed prickly pear to stock consuming it. His main conclusions are :—

(1) Amongst sheep in experiment [431 Merino ewes, 430 Persian ewes and 87 Merino wethers] at Grootfontein, an unexpectedly high mortality was observed from feeding prickly pear.

(2) Lesions of actinobacillosis were very common, infection apparently occurring through the agency of the pear spicule [glochid] a minute barbed thorn abounding on the plant. Deaths due to this cause, however, were not so numerous as deaths from other causes, and sheep with early lesions generally recovered when removed from prickly pear and placed upon good other food.

(3) Preisz-Nocard infection was also fairly frequent, transmission again probably occurring through the agency of the spicules penetrating the alimentary tract or skin.

(4) The majority of the deaths, however, were due to undetermined causes, the circumstances of death suggesting intoxication. In regard to these, the low nutritive value of the very watery cactus, the inadequate supplementary ration, the absence of water, and the fact of breeding, are regarded as predisposing factors. Certain substances in the pear itself, causing continuous scouring and reduction of resistance of the animal, together with a stomatitis caused by the thorns and spicules, are regarded as injurious factors.

(5) The losses in lambs amounted to over 40 per cent. and were attributed to the inadequate food supply of the mothers. Most of the lambs were born dead or died shortly after birth from lack of milk, a small proportion also dying from the direct effects of the prickly pear.

H. H. GREEN.

STEYN, D. G. (1931). **Investigations into the Cause and Transmission of Lumpy Wool affecting Merino Sheep and its Treatment.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. pp. 205-213. 6 figs. [3 refs.] Pretoria : Govt. Printer.

" Lumpy Wool," a disease of sheep causing considerable damage to the fleeces, and in the worst cases ending fatally, was first brought to the notice of the veterinary department of the Union of S. Africa in 1925. The author investigates it in sufficient detail to establish it as a dermatomycosis essentially the same as that recently described by BULL in Australia [(1929). " Dermatomycosis of the Sheep (Lumpy or Matted Wool) due to *Actinomyces dermatonomus* n. sp."—*Austr. J. Exp. Biol. & Med. Sc.* **6.** 301.]

Cases of " lumpy wool " are detected in the early stages at the time of shearing, when the " lumps " are found in the fleece. The disease appears in isolated spots on the back and sides of the affected animal, as an exudation of yellowish material which subsequently dries in small masses matting the wool fibres. As the disease progresses, confluence of the isolated lumps occurs and large areas of the skin become covered by hard masses of matted wool.

Incidence of the disease is reported chiefly from areas of high rainfall and mist—Natal and the Eastern Cape Province, especially during moist warm weather. Mortality is low, and transmission slow, but under climatic conditions favourable to the growth of the fungus affected cases end fatally unless treated.

" In-contact " experiments were negative but transitory lesions closely resembling those of the disease were produced by rubbing freshly collected infected wool scrapings (showing the fungus in smear preparations) into moistened skin (intact or scarified).

Similar results were obtained by pouring pure cultures of the fungus on to scarified skin. Early cases of the disease are easily treated with a mixture of equal parts of raw linseed oil and $3\frac{1}{2}$ per cent. tincture of iodine, but the author recommends slaughter of advanced cases and isolation of affected animals.

H. H. GREEN.

BAUDET, E. A. R. T. (1930). Sur une Souche d'Aleurisma lugdunense isolée de la peau d'un dromadaire. [**A Strain of** *Aleurisma lugdunense* **isolated from the Skin of a Dromedary**].—*Ann. de Parasitol.* **8.** 628-637. 3 figs. [10 refs.]

The parasite described in this paper was recovered by culture from a drome-

dary affected with ringworm. Details are given of the morphology, cultural characters and affinities of the parasite ; for these the original must be consulted.

The organism is said to be identical with the type recovered from man by Massia and Grigoraki in 1924, but the spore chains and racquet forms described by these authors have not been detected. Baudet is of the opinion that these forms are simply swollen elements of the mycelium. The parasite obtained from the dromedary develops a pink colour in primary cultures on agar. It is not pathogenic for the guinea pig.

A. LESLIE SHEATHER.

DISEASE CAUSED BY PROTOZOAN PARASITES.

Neitz, W. O. (1931). **Blood Parasites of Game in Zululand.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. pp. 45-60. 22 text figs., 8 tables. [11 refs.] Pretoria : Govt. Printer.

This paper is a record of the blood parasites found in game shot in the Hlabisa and Lower Umfolozi districts. The game was shot to create a buffer zone between the game reserves and the stock farms and it was found that its destruction was associated with a considerable reduction in the number of tse-tse flies.

Two blood smears, two spleen smears and two gland smears were examined from each of 440 animals to determine the extent to which the game harboured pathogenic trypanosomes. *T. vivax* was identified in the blood of a bushbuck and *T. congolense* was found in the blood of a bushbuck, a kudu and a zebra.

Small piroplasms were found in a large number of species :—zebra, bushbuck, duiker, waterbuck, kudu, blue wildebeest, reedbuck, mountain reedbuck, steenbuck and antbear. Microfilaria were found in one bushbuck and five warthogs. Figures are given of a number of the parasites encountered.

A. LESLIE SHEATHER.

Henderson, W. (1931). **The Relationship of Pica in Cattle to Trypanosomiasis.** —*Vet. J.* **87.** 518-529. 3 tables. [10 refs.]

This paper deals with investigations undertaken to determine whether trypanosome infection is the cause of pica, a condition commonly observed in cattle in Northern Nigeria. The occurrence, distribution, symptoms, lesions, diagnosis and treatment are all discussed. While pica disappears simultaneously with the trypanosome infection after tartar emetic treatment, it is not specific for this condition ; it is observed in pigs fed on a rachitic diet and in cattle in South Africa on a phosphorus deficient diet. The herbage of Nigeria is deficient in minerals. Pica is also cured in infected animals by feeding bone meal simultaneously with the provision of rock-salt licks. The condition is considered to be an acidosis with consequent upset of the alkali reserve of the blood. The uncompensated loss of sodium and calcium in trypanosomiasis leads to a craving for salts containing those elements which is expressed by symptoms of pica.

J. R. M. INNES.

Donatien, A. (1931). Les piroplasmoses. **[The Diseases caused by Piroplasms].**—*Rec. Méd. vét.* **107.** 959-976. 2 illus.

This article is an address given in the course of the " Journées vétérinaires

d'Alfort " in June, 1931. It contains a description of the Piroplasmidæ, Theileridæ and Anaplasmidæ, the clinical appearances and the pathology of the diseases caused by these parasites and methods of treatment and prophylaxis.

Under North African conditions, the author recommends inoculation of cattle in two stages : towards the end of November, animals should be inoculated with blood containing *B. bigeminum*, *B. berbera* and *An. marginale* and, in March, the animals should receive inoculation of *Th. dispar*.

A table is appended showing the results of multiple inoculation during four years. Fatalities varied from 0·9 to 1·0 per cent. except in one season when they reached 5·5 per cent., anaplasmosis accounting for 5·0 per cent. Among controls the mortality ranged from 20-80 per cent.

D. A. E. C.

Du Toit, P. J. (1931). **Immunity in East Coast Fever.**—*17th Rpt., Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. pp. 3-25. 3 tables. 13 figs. [6 refs.] Pretoria : Govt. Printer.

It is well-known that immunity to " East Coast fever " can be broken down by exposure to natural infection by ticks, but, up to the present, there is no experimental evidence to show that a recovered animal can suffer a relapse in the absence of exposure to infected ticks. New outbreaks of the disease are frequently accounted for by farmers and others on the grounds that such breakdowns of immunity do occur, thus making the starting point of a new centre of infection.

In 1928, the author reported experiments which aimed at producing such relapses without the intervention of ticks, but the details were not given ; these are now included in the present paper for the sake of completeness and ease of reference. In the first experiments, substances which are known to be capable of producing relapses in other protozoan diseases were injected ; a condition of anæmia was produced by venesection and by the injection of ichthargan. Splenectomy was performed, attempts were made to set up peritonitis and to produce metritis and abortion, and animals were infected with trypanosomes and " heartwater."

Finally, a camp was established on a farm where recovered and susceptible animals were kept together for a period of three years, the number of animals within the camp being maintained at about 30 during the period. The area of the camp was about 200 acres and the grazing was such that 30 animals were as many as it would support. These animals were kept under very careful observation. Although a large variety of protozoan infections developed in animals concerned in some or other of the experiments, no case of " East Coast fever " occurred. Infection with *Th. mutans* occurred and the author explains his reasons for feeling absolutely confident that no confusion arose between these parasites and *Th. parva*. The essential reason was that no acute fatal infection occurred.

A. LESLIE SHEATHER.

Yakimoff, W. L., & Iwanoff-Jobzem, P. S. (1931). Zur Frage der Infektion der Tiere mit heterogenen Kokzidien. [**The Infection of Animals with Coccidia Derived from other Species**].—*Zlb. Bakt. I.* (*Orig.*). **122.** 319-328. 2 tables. [29 refs.]

The authors publish the results of experiments in which coccidia, obtained

from the fæces of a rabbit (*E. stredæ*, *E. perforans* and *E. magna*), of a fowl and of a pigeon, were used for the experimental infection of dogs, fowls, pigeons, rats and mice. The results obtained were negative in all cases.

The results of the tests with the parasites of the fowl and the pigeon lead the authors to conclude that these are distinct species and that *E. pfeifferi* is not a synonym for *E. tenella* as suggested by HOFKAMP.

A. L. SHEATHER.

CANNON, P. R., & TALIAFERRO, W. H. (1931). **Acquired Immunity in Avian Malaria. III. Cellular Reactions in Infection and Superinfection.**— *J. Prevent. Med.* **5.** 37-64. 4 tables, 7 figs. on 1 coloured plate. [20 refs.]

The third of a series of papers dealing with the reactions of the tissues in avian malarial infections in canaries infected for the first time with *Plasmodium cathemerium* and in canaries with latent malarial infections which have been re-inoculated with the parasite. Particular attention has been paid to the reticulo-endothelial system and this work corroborates earlier studies showing that resistance to avian malaria is associated with phagocytosis of the parasites by the macrophages. In normal birds injected intravenously with parasitised red cells, the entire parasite-erythrocyte combination is phagocytosed and phagocytosis by macrophages occurs as early as four hours following infection. There is evidence of activation of the mesenchyme 18 hours after infection and this increase appears to be at its peak eight to ten days after infection and coincidently with the crisis. This activation is evidenced in the liver by swelling of the Kupffer cells and by an increased number of macrophages in the spleen. Phagocytosis of the parasite-erythrocyte combination is limited mainly to the macrophages of the liver and spleen.

In birds with latent infections, injected intravenously with parasitised erythrocytes, phagocytosis is much more rapid and effective, being apparent within 15 minutes of infection ; after 24-48 hours, all the parasites have been removed. The activity of the mesenchyme declines slowly and is still effective 654 days after initial infection.

The mechanism of immunity to superinfection appears to depend on an actual increase in the number of phagocytic cells and on a greatly increased rate of phagocytosis by the individual phagocytes.

The authors justly point out that their studies have a wider significance than merely the demonstration of resistance to the parasites of bird malaria. There are many features in the general mechanism of defence against infective agents common to all species of hosts and to all microbic agents.

R. LOVELL.

DISEASES CAUSED BY FILTRABLE VIRUSES.

GREAT BRITAIN. (1931). **Fourth Progress Report of the Foot-and-Mouth Disease Research Committee, Ministry of Agriculture and Fisheries.** 375 pp. 24 figs. (9 coloured). London : H.M. Stationery Office. [7s. 6d.] [8vo.]

The introductory pages are devoted to a summary of the progress made in this country and abroad since the last Progress Report was published in June, 1928.

The remainder of the report is divided into five appendices ; four give the

details of the experimental work and conclusions of the workers at various institutes and the final one consists of a bibliography.

The investigations of the Committees have been carried out on small laboratory animals at the Lister Institute of Preventive Medicine, Chelsea ; at the National Institute for Medical Research, Hampstead ; and at the Public Health Laboratories of the University of Manchester. At the Experimental Station of the Ministry of Agriculture and Fisheries, at Pirbright, large domesticated animals, as well as small experimental animals, have been employed.

The appendices will be dealt with as separate papers in this *Bulletin*.

NORMAN DOBSON.

GREAT BRITAIN. (1931). **Bibliography of Foot and Mouth Disease.** *Fourth Progress Report of the Foot-and-Mouth Disease Research Committee, Ministry of Agriculture and Fisheries.* Appendix V. pp. 360-375. London : H.M. Stationery Office. [7s. 6d.] [8vo.]

In the second and subsequent reports of the Committee, a bibliography has been included. When the list of references in the Second Progress Report was compiled, the aim was to make it complete from the beginning of 1924. A few of the more important papers before that date were, however, included. An extensive review of the literature of foot and mouth disease prior to that date will be found in the article by GINS and KRAUSE [(1923-4). " Zur Pathologie der Maul- und Klauenseuche." *Ergebnisse der allg. Path. u. path. Anat. München.* **20.** 805-912.].

The bibliography of the Fourth Report is arranged as previously, with the authors' names in alphabetical order, and comprises a list of 214 references. This list now completes an excellent bibliography up to the date of the present report.

NORMAN DOBSON.

POPPE, K., & BUSCH, G. (1931). Fermentstudien am Virus der Maul- und Klauenseuche. **[Studies on Ferments of the Foot and Mouth Disease Virus].**—*Zlb. Bakt. I.* (*Orig.*). **122.** 576.

The authors deny certain assumptions made by PYL [see this *Bulletin*. **1.** 282.] regarding their previous paper. They say that they did not state that the ferments sprang from the virus itself ; they were unable to obtain pure virus from the substrates. With regard to the connection between infectivity and ferment content, they state further that they merely found virus and ferments to be demonstrable in the same dilutions.

In foot and mouth disease they found a reduction in blood amylase. " As amylase, lipase and oxydase were only observed in infective material, these ferments are properties of the foot and mouth disease vesicle lymph. Virulence corresponded to the ferment content for, on the one hand, non-virulent material did not give these reactions whilst, on the other hand, the virus could not be separated from the ferments."

In conclusion, Poppe and Busch wish to make it clear that in their opinion these ferments are produced by irritation caused by the virus though other irritants can also give rise to them.

J. T. E.

RABATEL, J. (1931). La lutte contre le Peste bovine au Dahomey. [**The Control of Cattle Plague in Dahomey**].—*Rec. Méd. vét. exotique.* **4.** 65-83. 2 maps. [1 ref.]

This memoir, which was written some years ago, was awarded the Prix Trasbot in 1930 by the Académie Vétérinaire, Paris.

The author describes the measures taken to prevent the introduction of cattle plague into Dahomey from neighbouring colonies, the disease being introduced mainly through the movements of affected cattle.

He recognises that the ideal method of control would be to quarantine and immunise cattle at the frontier, but, as facilities for the large scale preparation of immune serum do not yet exist, the authorities resorted to sanitary measures and to the withdrawal of healthy cattle from the vicinity of infected areas. These measures, although admittedly inadequate, were all that could be enforced under existing circumstances and, by means of them, the authorities have succeeded in keeping the disease within reasonable bounds.

T. M. DOYLE.

NICOLAU, S., & GALLOWAY, I. A. (1931). Modification de certaines propriétés d'une souche de virus d'encéphalo-myélite enzootique (Maladie de Borna). [**Modification of Certain Properties of a Strain of the Borna Disease Virus**]. —*C.R. Soc. Biol. Paris.* **107.** 135-137. [4 refs.]

It has been found that a strain of the Borna disease virus, obtained in 1926 from ZWICK from a natural case of the disease, has become less virulent in the succeeding years, the virulence, however, showing some fluctuation. In 1926 the average lethal period in rabbits inoculated subdurally with fresh virus was 32 days, but rabbits so infected now survive for an average of 44 days. The virus has, therefore, behaved in a similar manner to the herpes virus and to the poliomyelitis virus.

Another observation made is that, as the virulence has diminished, the Jœst-Degen bodies have become smaller and less numerous.

J. T. E.

NICOLAU, S., GALLOWAY, I. A., & KOPCIOWSKA, L. (1931). Conditions de conservation du virus desséché de l'encéphalo-myélite enzootique (maladie de Borna). [**Preservation of Dried Virus in Borna Disease**].—*C.R. Soc. Biol. Paris.* **107.** 30-32. [5 refs.]

The authors note that desiccated virulent brain, maintained in sealed tubes at laboratory temperature without special precautions to exclude light, was still infective for three rabbits 373 days later. The animals exhibited characteristic symptons and died 47, 50 and 55 days respectively after inoculation, with typical histological changes in the nervous system. According to the authors, these observations, in conjunction with previous experiments on infection by the digestive and respiratory tracts, may explain the occurrence of remote outbreaks of Borna disease.

R. E. GLOVER.

CLEARKIN, P. A., & SKAN, D. A. (1931). **The Effect of Repeated Calf Passage on the Immunising Power of Vaccine Lymph.**—*Brit. J. Exp. Path.* **12.** 322-327. 8 tables. [11 refs.]

Experiments were devised to ascertain whether the diminished activity of vaccinia which results from the transference of the virus through the calf, was accompanied by any alteration in its antigenic powers. The lymphs obtained by successive passages through the calf (23, 31 and 33 transferences respectively) were compared by the intradermal inoculation of monkeys with an alternate calf-monkey strain. Although, in every case, the calf strains were much less active than the calf-monkey strains, there was no appreciable difference in the degree of immunity conferred on monkeys by the two types.

R. E. GLOVER.

Balozet, L. (1931). Réceptivité de la chèvre et du cheval à l'inoculation intracérébral du virus claveleux. [**Susceptibility of the Goat and the Horse to the Intracerebral Inoculation of Sheep-pox Virus**].—*C.R. Soc. Biol. Paris.* **107.** 1461-1462. [2 refs.]

Balozet, L. (1931). La virulence des centres nerveux, du sang, et des muscles dans la clavelée expérimentale. [**The Virulence of the Central Nervous System, the Blood and the Muscles in Experimental Sheep-pox.**]—*Ibid.* 1462-1463. [2 refs.]

Balozet, L. (1931). L'orchite clavéleuse expérimentale du mouton. [**Experimental Orchitis in Sheep-pox**].—*Ibid.* 1464-1465.

It is generally admitted that, although the goat is refractory to sheep-pox under natural conditions, its resistance can be overcome by artificial means; on the other hand, there is a difference of opinion regarding the susceptibility of the horse. The author has examined the susceptibility of these animals to intracerebral inoculation of the virus, a goat and a horse receiving 0·2 c.c. and 0·5 c.c. respectively of a highly virulent strain of sheep-pox. The former showed a sharp rise in temperature and slight cerebral disturbances which had subsided by the fifth day, while the latter was entirely unaffected.

The author also undertook a series of experiments on sheep to determine the relative amount of virus present in selected tissues. A series of sheep was inoculated intradermally with the same strain of sheep-pox and at varying periods [the actual time after inoculation in the different experiments is not stated]; samples of skin, blood, muscle, lung and central nervous system were tested for the presence of virus by intradermal inoculation. The virus was constantly recovered from the skin and the lungs, but only occasionally from the other tissues.

Continuing his experiments on tissue susceptibility, he transmitted the virus to the testicle of the ram by the inoculation of an emulsion of virulent sheep brain. This provoked an orchitis characterised by an extreme congestion of the organ accompanied by a marked rise in temperature. The virus remained localised to the testicle, but the animal was subsequently found to be immune.

R. E. GLOVER.

Bardach, M. (1931). Quelques observations sur les lésions de la moelle, provoquées par le virus vaccinal. [**Observations on the Lesions in the Spinal Cord caused by Vaccine Virus**].—*C.R. Soc. Biol. Paris.* **107.** 1468-1471. 2 text figs.

The author gives a description of a peculiar strain of neurovaccine of which he was unable to determine the origin. A rabbit, which had received a subdural

inoculation of an emulsion of mouse brain which failed to affect other rabbits injected at the same time, died from a severe meningo-encephalitis. The strain, which was successfully passed through a series of 76 rabbits by direct intracerebral inoculations, produced typical lesions of vaccinia in the skin of the guinea pig and in the skin, testicle and cornea of the rabbit : also in two calves and two cows it provoked eruptions indistinguishable from the lesions of dermovaccine. It was also proved by cross-immunity experiments to be identical with vaccine virus. The most striking symptom in the rabbit was the onset of paralysis, generally on the second day, death supervening within the following 24 hours.

Macroscopically, the brain and spinal cord presented scattered lesions, either in the form of areas of softening or as actual cavities, 3 to 4 cm. in size, involving the grey matter. Microscopically, the brain and cord showed a typical vaccinal meningitis, while the central canal was usually occluded with a mass of albuminous material. There was a marked absence of reaction products around the softened areas and the cavities.

The author was able to produce similar although less intense lesions with two other strains of neurovaccine.

R. E. GLOVER.

BREED, Frank. (1931). **Observations Relative to Swine Immunisation (Swine Fever).**—*Vet. Med.* **26.** 320-323.

BUCHANAN, J. M. (1931). **The Use of Swine Fever Serum.**—*Vet. J.* **87.** 101-103. 1 table.

TISCHHAUSER, L. A. (1931). **Baby Pig Vaccination to immunise against Cholera.** —*North Amer. Vet.* **12.** No. 5. 31-34.

Breed discusses the various factors which may have an adverse effect on the results of the serum-virus method of immunisation against swine fever. Most of the troubles to which he refers may be attributed, not to any failure to confer immunity, but to the inoculation of pigs which are abnormal either as the result of dietetic errors or of disease.

Buchanan has obtained varied results from the use of the serum-alone method for the protection of in-contact pigs on infected premises or as a curative agent for pigs already affected with the disease.

Large doses of serum were given to 251 affected pigs and 195 [77 per cent.] died. The mortality among 654 in-contact pigs after the administration of serum was 139 [18 per cent.].

The author suggests that the temperature of all in-contact pigs should be taken before the administration of serum and that those showing a rise of 2° F. should be isolated. He considers that the use of serum alone for the treatment of affected animals or for protection against swine fever, leaves much to be desired. Its cost militates against its widespread application and it has no effect once the disease is established.

[It is generally recognised that hyperimmune swine fever serum is of little value as a curative agent and that the results following its administration to in-contact animals depend on the degree of infection in the herd. It has long been established that potent serum is capable of protecting healthy in-contact pigs, but that it is of little use to administer it to pigs in the incubative stage of the disease—a practice which is too frequently followed. The early recognition of the disease, followed by the immediate administration of serum, are essential factors for its successful application.]

Tischhauser records his experience of the immunisation of 55,000 pigs during the past nine years, the majority of them being under six weeks of age. Only one bad result was obtained and that was because insufficient serum was given. The author considers that, under average farm conditions, the best time to vaccinate pigs is from the fourth to sixth week after birth and, in his experience, the most unsatisfactory time is immediately after weaning.

He considers that the good results obtained from early immunisation can be explained by the fact that pigs have not yet become weakened from worm infestation, necrotic enteritis [*B. suipestifer* infection], mange or other chronic affections.

T. M. DOYLE.

Kœn, J. S. (1931). **Hog Cholera.**—*Vet. Med.* **26.** 275.

The author believes that, in a great many cases, it is possible to make a diagnosis of hog cholera (swine fever) on the clinical history and symptoms and that, when these are considered in conjunction with the lesions, a definite diagnosis can invariably be established. He regards petechiæ, particularly on the kidneys, as being of little diagnostic value.

According to Kœn, the three principal lesions are :—(1) peripheral congestion of the lymph glands ; (2) hæmorrhages in the lungs, and (3) enlargement and congestion of the spleen.

[The author's opinions on diagnosis and of the relative diagnostic value of the various lesions will hardly meet with general agreement.]

T. M. DOYLE.

Huddleson, I. Forest, & Johnson, H. W. (1931). **Study of Anti-Hog Cholera Serum and Virus for the Presence of Brucella.**—*J. Amer. Vet. Med. Ass.* **79.** 634-637.

Paper presented to the 68th Annual Meeting of the American Veterinary Medical Association.

As brucella infection is a common disease in hogs in the State of Michigan, the authors have investigated the means or routes by which it spreads from herd to herd. On the average farm, most of the sows used for breeding purposes are reared from the farm stock ; there is, in consequence, not as much traffic in hogs for breeding purposes as there is in cattle, so the disease can hardly be spread as a rule by this means.

The authors considered the possibility that the disease might be spread by the use of infected hog cholera serum or virus. Most manufacturers add phenol to serum and virus as a preservative and, in some cases, commercial serums are pasteurised.

The authors tested the viability of the porcine strain of *Br. abortus* to 0·5 per cent. phenol, to serum and to virus containing 0·5 per cent. phenol and kept in an ice box at 15° C. The organism did not survive for longer than two weeks in serum, but it appeared to multiply during the first four months in virus ; there was, however, a reduction in the amount of growth after five months and no growths were obtained after six months. Approximately the same results were obtained when the experiments were repeated.

The authors began to examine samples of commercial serum and virus in June, 1930. In the first set of experiments they tested 30 serial lots of clear serum,

16 serial lots of whole-blood serum and 24 serial lots of virus from 23 manufacturers—each lot of serum or virus usually representing the pooled blood of several hogs.

Cultivation tests consisted of sowing heavily on to beef-liver-agar plates directly from the manufacturer's container, and also from the centrifugalised sediment from 5 c.c. portions of each sample, and incubating both in aërobic conditions and in an atmosphere of carbon dioxide. In addition, 39 samples of virus and whole blood serum were injected subcutaneously into guinea pigs in 1 c.c. amounts.

Most of the samples that were injected into guinea pigs were so heavily contaminated with other bacteria that it was impossible to detect the presence of Brucella by direct bacteriological examination.

All the tests carried out failed to demonstrate the presence of *Br. abortus*.

Another series of tests was then carried out to cover the possibility that there might be a seasonal incidence of the organism in such material taken from naturally infected hogs. Negative results were obtained in samples taken from December, 1930, to March, 1931, covering 43 serial lots of whole blood serum, one lot of clear serum and 59 serial lots of virus. Negative results were also obtained when 1 c.c. amounts of blood from 100 hogs which reacted at high titres were tested by inoculation into guinea pigs.

There is a brief report of the discussion on the paper. CAHILL spoke of tests carried out by his laboratory but the context is ambiguous and the nature of the tests made is not clear. FITCH stated that his laboratory had examined the blood of 17 cattle, both preceding and following the act of abortion, using " much larger quantities of blood than have been reported from swine," and that they only isolated the organism four times from three animals.

W. A. P.

I. SHOPE, R. E. (1931). **Swine Influenza. I. Experimental Transmission and Pathology.**—*J. Exp. Med.* **54.** 349-359. 1 table. 3 plates. [7 refs.]

II. LEWIS, P. A., & SHOPE, R. E. (1931). **Swine Influenza. II. A Hæmophilic Bacillus from the Respiratory Tract of Infected Swine.**—*Ibid.* 361-371. 4 tables. [7 refs.]

III. SHOPE, R. E. (1931). **Swine Influenza. III. Filtration Experiments and Etiology.**—*Ibid.* 373-385. 1 table. [7 refs.]

I. The author points out that the term " hog flu " embraces more than one clinical entity and that the true disease is recognisable by the high morbidity and marked prostration of affected animals.

Swine influenza (" hog flu ") was first recognised as a clinical entity in 1918. It is most prevalent during the autumn and winter months and generally occurs in epizootic form. Its onset is sudden and the whole herd is usually affected. Fever, marked weakness, coughing and a peculiar abdominal type of respiration are characteristic symptoms. The duration of illness is short, varying from two to four days. The average mortality ranges from one to four per cent., but occasionally the losses exceed 10 per cent.

The disease was readily induced artificially by the intranasal instillation of suspensions of bronchial mucous or mixed suspensions of bronchial mucous, lymphatic glands and lung tissue. On account of the highly infectious nature of the disease, elaborate precautions were necessary for the isolation of experimental animals.

A mild leucopenia was usually observed in both the naturally and artificially induced disease.

The author made a detailed study of the histopathology of the disease. The main features observed were :—an exudative bronchitis accompanied by damage to the bronchial epithelium, a peribronchial round cell infiltration and massive pulmonary atelectasis. The lymphatic glands, particularly the cervical and mediastinal, were hyperplastic and œdematous.

II. A hæmophilic bacillus was repeatedly isolated in pure culture from the respiratory tract of a series of artificially infected and from a few naturally infected pigs and the name *Hæmophilus influenzæ* (variety *suis*) has been suggested for the organism.

Twelve out of 13 attempts to produce the infection by intranasal inoculation with pure cultures of the organism gave negative results ; the remaining pig developed a condition which might have been a mild attack of swine influenza.

III. In preliminary experiments it was shown that, by the intranasal inoculation of bacteria-free filtrates (Berkefeld) of material from animals affected with swine influenza, a mild but definitely contagious illness could be induced.

The infection set up was not typical swine influenza, but clinically and pathologically it was considered to be an *incomplete* form of the disease.

The hæmophilic bacillus, *H. influenzæ suis* was absent from the respiratory tract of swine affected with the disease produced by the filtrate. Swine inoculated with a mixture of filtrate and the hæmophilic bacillus developed a typical attack of swine influenza. The author concludes that swine influenza is caused by the combined action of a filterable virus and *H. influenzæ suis*.

Cross-immunity tests proved that the virus of this disease and the virus of hog cholera (swine fever) are immunologically distinct.

T. M. DOYLE.

Belschner, H. G., & Edgar, G. (1931). **Infectious Nasal Catarrh of Sheep.**—*Austral. Vet. J.* **7.** 98-103. 2 tables.

Nasal catarrh in sheep is generally regarded as indicative of an invasion by nasal bots or by lung-worms. The present investigation shows that there exists a widespread, contagious form of catarrh which is probably caused by a filterable virus. The condition is characterised in the early stages by a congestion of the nasal mucous membrane accompanied by a watery nasal discharge ; later, a copious mucoid exudate is produced which dries around the nostrils. British breeds of sheep (Border Leicester and Romney Marsh) are particularly susceptible, while the incidence in the Merino is considerably smaller. In order to demonstrate the infectivity of the nasal discharge, material from a natural case was applied to the nasal mucosa of two experimental animals, one of which became affected. From this animal, the disease was further transmitted to four out of six sheep by swabbing the nasal mucosa. In addition, sheep placed in contact with experimentally infected animals, contracted the condition.

A number of organisms was isolated from the exudate, but no common type prevailed. The introduction of cultures of these organisms into the nostrils of sheep failed to produce symptoms of nasal catarrh. The infective agent is relatively fragile since nasal discharges collected in the field were inert after a lapse of three days.

R. E. GLOVER.

James, W. A. (1931). **Chicken-Pox Control.**—*Vet. Med.* **26.** 273-274.

The author states that the mouth form of fowl pox is the most prevalent type met with in Illinois and that the mortality is low. He carried out immunity experiments, using a vaccine consisting of a saline suspension of powdered pox crusts.

Inoculations were made either by brushing the vaccine on to a plucked area of skin or by stabbing the skin with a sharp pointed scalpel which had been dipped in vaccine. Both of these methods confer a solid immunity.

[Experience has shown that vaccines prepared from unmodified fowl pox virus confer a lasting immunity, but are unreliable and dangerous in action. There is usually loss of condition in the treated fowls and, frequently, there is generalisation of infection while, occasionally, heavy mortality is encountered. Vaccine prepared from pigeon pox virus is used exclusively in this country and, although the immunity conferred by it is less than that given by vaccines containing fowl pox virus, it is sufficient to protect against natural infection and has the additional value of being free from danger.]

T. M. DOYLE.

Glover, R. E. (1931). **Experiments on the Virus of *Epithelioma Contagiosum*.** —*First Rep. Direct. Inst. Anim. Path. Cambridge.* pp. 1-16. [31 refs.]

The main object of this work was the cultivation of the virus of *epithelioma contagiosum*. The author employed pigeon pox virus in preference to the virus of fowl pox on account of the more uniform results obtained in titration experiments with the former. The infectivity of the pigeon pox virus varied between 1 : 50,000 and 1 : 100,000 ; dried crusts in sealed tubes showed no loss of potency after 18 months' storage in the cold room.

Glover encountered the usual difficulty in filtering this virus, but succeeded in passing it through a Berkefeld V candle ; the substitution of a buffered solution (pH 7·8) for normal saline solution appeared to increase its filtrability.

Particular attention was paid to obtaining a ready supply of bacteria-free seed material, a difficulty which has frustrated the efforts of many previous workers on this phase of the disease. Glover overcame this obstacle by making use of the virus contained within the feather follicles and found that suspensions of the contents of the follicles invariably yielded a good supply of uncontaminated potent virus.

All attempts to cultivate the virus in liquid and semi-solid media gave negative results. It was, however, successfully cultivated in a medium consisting of Tyrode's solution (pH 7·4), plasma, tissues from 10 to 14 day-old chick embryos and extract of chick embryos. The source of the plasma (rabbit, guinea pig or fowl) provided that it was obtained from young animals, appeared to have no appreciable influence on the growth of the virus.

T. M. DOYLE.

Frobisher, M. (1931). **Electrophoresis Experiments with the Virus and Protective Bodies of Yellow Fever.**—*J. Exp.Med.* **54.** 733-745. 2 tables, 1 fig. [20 refs.]

Electrophoresis experiments were carried out with " yellow fever " virus obtained from infected monkeys or from infected blood-free mosquitoes, and suspended in saline dilutions of clear, hæmoglobin-free normal monkey serum. At

a slightly alkaline reaction, the virus migrates to the kathode but, at slightly acid reactions, it migrates to the anode. The virus was inactivated by exposure to monkey serum at pH 5·0 for three hours.

The presence of partly hæmolysed red blood corpuscles caused the virus to migrate to the anode, even at alkaline pH. Protective bodies in yellow fever immune serum appear to carry an opposite charge as they migrate to the anode in slightly alkaline saline dilutions of serum. The number of experiments reported is not large.

W. R. WOOLDRIDGE.

Nyberg, Carl. (1931). Ueber Nachweis und Gewinnung von Bakteriophagen. **[The Demonstration and Isolation of Bacteriophages].**—*Zlb. Bakt. I. (Orig.).* **122.** 270-276. 6 tables. [10 refs.]

Generally speaking, bacteriophages can be isolated from material under examination by filtration through a bacterium-proof filter. This method may be improved by such modifications as preliminary heating of the material to 60° C. and the addition of peptone and salt or of broth.

The author's method, which he devised for the special purpose of isolating bacteriophages for various types of colon bacilli, is as follows :—

Broth cultures (pH 7·8) are made of the organism under examination and against which the bacteriophage is required ; some of the material considered likely to contain the bacteriophage is added to this broth culture and the mixture is filtered after incubation for 24 hours at 37° C.

A. LESLIE SHEATHER.

DISEASES CAUSED BY METAZOAN PARASITES.

Austen, E. (1931). **A New Species of Warble Fly (Diptera—Family Tachinidæ, Subfamily Hypodermin æ, Genus *Hypoderma*) which attacks Goats in Cyprus.** —*Bull. Entom. Res.* **22.** 423-429. 5 plates.

The species described, *Hypoderma æratum*, the specimens of which were collected by H. M. Morris, Government Entomologist, Cyprus, forms an addition to the group of hypoderma in which the hairy covering is not conspicuous and the dorsum of the thorax is not banded by spiny, black, raised stripes or longitudinal wheals.

The species is differentiated from *H. silenus* (South Europe) by the golden or brassy dorsum of the abdomen, from *H. crossi* (Punjab) by the larger size and by the tibiæ being less strongly infuscated, and from *H. corrinnæ* (Algeria) by the head being narrower than the thorax, by the shorter hair and by the colour of the abdomen which is gold instead of greenish brown.

The larva of *H. æratum* is of cream buff colour. Near their anterior borders, the second to the eighth segments bear a more or less fleshy ridge of recurved spines like tubercles, some of which have black chitinous points ; on the anterior border of the ventral surface of the three following segments there is a transverse band of similar tubercles. The dorsal surface of each segment from the second to the seventh has a narrow posterior band of minute spines with chitinous tips which are directed anteriorly. Ventrally, the posterior borders of the second to the eighth segments bear corresponding transverse bands. On the second to the seventh segments these bands extend to the area of the lower lateral swelling.

The author quotes P. GENNADIUS who informed him that the larvæ are commonly found subcutaneously on the back (loins) of young goats, one to two years old. They are sometimes found also in cattle and rarely in sheep and dogs. They are said to occur commonly in July, the incidence diminishing until February when they are rarely seen. Treatment of the back with petroleum or laurel infusion is said to prevent infestation. The skins of affected animals are only worth one-third to two-thirds of the normal value.

U. F. RICHARDSON.

NASH, T. A. M. (1931). **The Relationship between *Glossina morsitans* and the Evaporation Rate.**—*Bull. Entom. Res.* **22.** 383-384. 1 graph.

The author endeavours to correlate seasonal variations in fly density with variations in the evaporation rate. The evaporation rate readings were made at the Kikori Entomological Station, Tanganyika, and the fly density figures were taken from the North East Kikori round which, it is stated, is not greatly influenced by game movements.

It is suggested that an evaporation rate of 25 c.c. *per diem* (Livingston atmometer) was most favourable for the fly community and that an increase or decrease in the rate was inimical. The effect on the fly community became noticeable after a lag of about a month.

The observations only extended over a period of 18 months.

U. F. RICHARDSON.

SMIT, B. (1931). **A Study of the Sheep Blow-Flies of South Africa.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. pp. 299-421. 33 tables, 9 plates, 1 map, 4 charts, 4 photographs, 1 diagram. [177 refs.] Pretoria : Govt. Printer.

A comprehensive study of the sheep blow-flies of S. Africa. The paper is cast in thesis form [D.Sc. Agric. Univ. of S. Africa] with numerous illustrations, an extensive bibliography, and sub-divisions as follows :—

INTRODUCTION, dealing with the wool industry of South Africa, importance of blow-flies, position with regard to maggots, and plan of investigation.

PART I, dealing with studies of the flies, classification of South African species (chiefly *Chrysomyia chloropyga*, *Lucilia sericata*, *Chrysomyia albiceps*), records of myiasis, distribution, localities, relative abundance of various species, seasonal distribution, habits of the flies (feeding, oviposition, responses, fly repellents), protection of sheep.

PART 2, dealing with conditions affecting the development of blow-fly eggs, with life histories, and with technique.

PART 3, dealing with studies of the maggots ; habits, feeding and migration ; effect of maggots on wool ; destruction of maggots (temperature, drowning, insecticides), disposal of carcasses, burying of maggots ; escape of maggots from jars or tanks [traps], emergence of flies through soil.

PART 4, dealing with parasites of blow-flies ; importance ; list of species ; *Mormoniella vitripennis* (hosts, life history) and *Alysia manducator*.

For entomological details the original paper must be consulted, but the following conclusions are of general veterinary interest :—

(1) Because of the enormous powers of reproduction which the blow-flies possess the most important control measure is the destruction of their breeding

places. This entails the proper disposal of all carcasses. Burial, even to a depth of 6 ft., is not effective, and carcasses are best used as bait in large fly traps. This method has met with remarkable success in South Africa.

(2) In regard to protection of sheep, crutching is the best method.

(3) For dressing infested sheep, oil mixtures containing volatile substances such as petrol, benzine, carbon disulphide, to kill the maggots, and repellents such as pyridine or pine tar oil, are most effective. Maggots were found remarkably resistant to many dips and disinfectants but the volatile parasiticides were the most effective. The mixture recommended for dressing (mixture D) consisted of cotton-seed oil 45 parts, petrol 40 parts, pine tar oil 10 parts, 5 per cent. carbolic acid 5 parts [parts by volume].

(4) The author does not recommend introduction of parasites to control the flies in South Africa, partly because of their unreliability and partly because of the possible incidental destruction of useful flies e.g. *Wohlfahrtia evvittata* which helps to keep the locust in check.

H. H. GREEN.

I. Mönnig, H. O. (1931). **A Second Species of the Nematode Genus *Acanthoxyurus*.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. pp. 269-271. 4 figs. [1 ref.] Pretoria : Govt. Printer.

II. Mönnig, H. O. (1931). **Two New Species of the Nematode Genus *Hartertia*.**—*Ibid.* pp. 273-276. 4 figs.

III. Mönnig, H. O. (1931). **Two New Nematodes from the Suricat (*Viverridæ*).**—*Ibid.* pp. 277-282. 8 figs. [5 refs.]

I. This new species is named *Acanthoxyurus shortridgei* and is described from two female specimens found in *Petromys cuneatus* and one female found in *Petromyscus* sp. The large cervical glands mentioned by Sandground in his description of *Acanthoxyurus anomaluri* were absent; a structure resembling cervical glands which was observed in the œsophageal region proved on dissection to be coils of the ovary.

II. The two new species of the genus *Hartertia* are named *H. zuluensis* and *H. natalensis*. The material, which consisted of three male specimens only, was collected from a bustard (species unknown) in Zululand.

III. The two new nematodes from the suricat belong to the genera *Habronema* and *Numidica* and are named *H. whitei* and *N. suricattae*. The material was collected in the Orange Free State from *Suricata suricatta*, *H. whitei* being located in the stomach and *N. suricattae* in the large and small intestines.

E. L. TAYLOR.

Coutelen, F. (1931). Recherches sur le système excréteur des Hydatides echinococciques. [**Researches on the Excretory System of the Echinococcus Cyst**].—*Ann. de Parasitol.* **9.** 423-455. 16 figs. [29 refs.]

In the first part of this paper, the author gives a full historical account of the study of the excretory system of the hydatid cyst, followed by a report of his own observations on its structure. A further report on the histogenesis and physiology of the system is promised at a later date.

The author's material was obtained fresh from the abattoir and many of his most valuable observations were made on the living unstained tissue ; examinations being also carried out by the use of vital staining and of serial sections of fixed and stained tissue.

The excretory system was seen to consist of excretory cells (flame cells) situated in the parenchyma of the posterior part of the scolex. The number of these cells varies greatly with the stage of development of the scolex, 10 or 12 is a common number, but as many as 20 were observed. The cells are drained by efferent canals which anastomose and finally join with a system of four large, longitudinal excretory vessels. These vessels are united by a circular canal in the anterior part of the scolex from which the flame cells and their efferent vessels are absent. The number of the longitudinal canals appears to be constant, four having been observed in every instance. At the pedicle by which the scolex is attached to the capsule, these four vessels anastomose to form three, two, or sometimes only one main vessel which traverses the length of the pedicle. The usual number of main vessels is, however, two and, on reaching the wall of the capsule, they travel along it and anastomose with similar vessels from other scolices to form a network, leading finally, by one or several excretory openings, into the general cavity of the cyst.

E. L. TAYLOR.

MOHAMMED, A. S. (1931). **Contribution to the Study of the Pathology and Morbid Histology of Human and Bovine Onchocerciasis.**—*Ann. Trop. Med. Parasit.* **25.** 215-298. 11 figs. [69 refs.]

In this paper, the author discusses at length the several aspects of the pathology of human and bovine onchocerciasis, with some particular reference to the mechanism of tumour formation. A short account is given of his histological observations on one tumour of *Onchocerca volvulus* and one of *O. gibsoni*, the remainder of the paper being devoted to a critical consideration of the observations of other workers. It is considered that the mature worms move about freely in the tissues producing microfilariæ for some time before the commencement of tumour formation. When this process begins, it is thought that the whole worm does not encyst at one time, but portion by portion until it is completely dragged into the tumour.

The tissue reaction is compared with similar reactions to other worm parasites and to some bacteria ; it is regarded as a manifestation of toxin production by the mature worms and by the larvæ.

The author considers that *Onchocerca volvulus* and *O. cæcutiens* are synonymous.

E. L. TAYLOR.

I. MÖNNIG, H. O. (1931). **The Specific Diagnosis of Nematode Infestation in Sheep.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. pp. 255-266. 1 table, 1 key, 22 figs. [10 refs.] Pretoria : Govt. Printer.

II. MÖNNIG, H. O. (1931). **The Development of Nematode Eggs and Larvae in Cattle Dung. Preliminary Note.**—*Ibid.* pp. 267-268.

III. MÖNNIG, H. O. (1931). **Wild Antelopes as Carriers of Nematode Parasites of Domestic Ruminants. Part I.**—*Ibid.* pp. 233-254. 25 figs. [8 refs.]

I. It is very desirable to be able to determine the nematode infestation of a living sheep, both for purposes of diagnosis and for the testing of anthelmintics. For the most part the eggs of the various species are indistinguishable, but the larvæ present differences which should enable an investigator to determine their specific identity without undue labour.

On account of the uncertain results obtained with larval cultures, an estimation of the number of larvæ which develop in a culture cannot be relied upon to give a true idea of the extent of the infestation ; an examination of the larvæ will, however, show the species of worms present and their relative numbers, but an egg count must be made to determine the actual numbers.

The author gives a short description of the larvæ, based on the literature and on his own observations. Figures illustrative of the various differences in the œsophageal and caudal regions and a table of measurements are given to aid in their differentiation. A key to the various species is here given verbatim. As the author points out, this may not hold for other species belonging to the same genera, but not included in the key.

1.	Without sheath, œsophagus more than one-third as long as the body...	*Strongyloides papillosus.*
	Sheathed, œsophagus not so long	2
2.	Total length less than 0·65 mm.	3
	Total length more than 0·65 mm.	4
3.	Oesophagus with distinct bulbar swelling ; tail of sheath with slender posterior extremity, less than 0·157 mm. long, usually 0·145 mm.	*Bunostomum trigonocephalum.*
	Similar, but tail of sheath over 0·157 mm. long, usually 0·172 mm....	*Gaigeria pachyscelis.*
4.	Tail of larva not ending in a simple point ...	5
	Tail of larva ending in a simple point ...	6
5.	Tail of sheath long, larva large	*Nematodirus spathiger.*
	Tail of sheath short, larva of medium size ...	*Trichostrongylus spp.*
6.	Tail of sheath over 0·2 mm. long, sheath frequently coarsely striated	*Oesophagostomum columbianum.*
	Tail of sheath less than 0·2 mm. long... ...	7
7.	Tail of sheath over 0·145 mm. long	8
	Tail of sheath less than 0·145 mm. long ...	9
8.	Tail of sheath 0·16 mm. long or longer ...	*Hæmonchus bedfordi.*
	Tail of sheath less than 0·16 mm. long, usually 0·15 mm.	*Hæmonchus contortus.*
9.	Tail of sheath more than 0·125 mm. long ...	*Cooperia spp.*
	Tail of sheath less than 0·125 mm. long ...	*Ostertagia spp.*

Referring to MORGAN's paper (1930) on this subject [see this *Bulletin*. **1.** 297.] the author states his disagreement with the comparison between the length of the tail of *Bunostomum trigonocephalum* and *Hæmonchus contortus* larvæ. Contrary to MORGAN, he has found the tail of *H. contortus* to be the longer of the two. He does not agree with MORGAN's method of measuring from the extremity of the sheath to the extremity of the larval tail, but considers that it is workably easy and more accurate to take measurements from the anus.

II. A heavy infestation of gastro-intestinal nematodes occurred among cattle grazing very bare pasture during a period of severe drought under conditions that would not be expected to favour the development of the larval worms. It was noticed that the grass on a small area round each heap of cattle dung on the pasture became green ; it was thought, therefore, that conditions in the heap of dung and the soil immediately surrounding it might be suitable for larval development and that the cattle grazing the small patches of green grass would thus take in large numbers of larvæ. Examination of the dung and of the soil immediately

surrounding it, showed that larvæ were able to develop there although they were not present in such large numbers as had been expected.

In the author's experience, the pasturing of sheep and cattle together exercises a bad influence in that it results in an increased worm infestation in the sheep. He thinks that this might be accounted for by the sheep grazing the small patches of heavily infested green herbage which grows round the cattle dung.

III. The author has been able to carry out *post-mortem* examinations on a number of wild antelopes and has discovered five new species and one new variety of trichostrongylid nematode :—*Impalaia nudicollis* from the blesbuck (*Damaliscus albifrons*) ; *Bigalkea albifrontis* (for which the new genus *Bigalkea* is made) also from the blesbuck ; *Bunostomum dentatum* from the waterbuck (*Cobus ellipsiprymnus ellipsiprymnus*) ; *Cooperia serrata* from the springbuck (*Antidorcas marsupialis*) ; *Cooperia antidorca* also from the springbuck, and *Cooperia fuelleborni* var. *hungi* from the waterbuck.

By carrying out cross-infection experiments, he has investigated the possibility that these antelopes may act as carriers of parasitic worms to sheep. For this purpose cultures of larvæ were prepared from the cæcal contents of the antelopes and were given to lambs which were free, or almost free, from worm infection, the results being observed by examination of the lamb's fæces and by searching for the worms at autopsy. In this way, *Hæmonchus contortus* was transferred from blesbuck and waterbuck to sheep ; *Trichostrongylus falculatus*, *Nematodirus spathiger*, *Cooperia serrata* and *C. antidorca* were transferred from springbuck to sheep ; *Hæmonchus contortus*, *H. bedfordi*, *Cooperia fuelleborni* and *C. fuelleborni hungi* were transferred from waterbuck to sheep ; and *Hæmonchus contortus*, *Trichostrongylus instabilis* and *Strongyloides papillosus* were also transferred from sheep to springbuck.

In South Africa, wild buck are frequently to be found on the same pastures with sheep and cattle and the author considers the possible transference of their parasitic worms to domestic animals to be an important problem and hopes shortly to be able to continue with further work on the subject.

E. L. TAYLOR.

NIGHBERT, E. M. (1931). **Reducing Losses caused by Worm Parasites of Livestock.**—*Vet. Med.* **24.** 352-353.

An account is given in popular language of the way in which parasites cause loss to livestock owners. The onset of parasitism is so gradual that the farmer is often unaware of it and his stock may be seriously affected before he begins to think of applying any control measures. Worm parasites multiply most quickly where there is the greatest concentration of stock and they take the greatest toll where the livestock industry is most thoroughly established. The eradication of worm parasites is out of the question for the present and control depends upon keeping their numbers at a low level by such sanitation methods as proper pasture rotation and suitable medication. The Extension Service of the Zoological Division of the Bureau of Animal Industry is willing to give what assistance it can in the arrangement of co-operative campaigns for the control of parasites.

E. L. TAYLOR.

MAROTEL. (1931). La lutte antidistomienne (3me note). **[The Control of Fasciolíasis (3rd note)].**—*Rev. vét. et J. Méd. vét.* **83.** 417-424. [2 refs.]

Previous papers by the author have dealt with the value of carbon tetrachloride in the treatment of fascioliasis and the feasibility of eradicating the disease through the repeated treatment of all possible carriers in districts where the disease is enzootic.

Good results were obtained in experiments recently carried out on 10 cattle and 35 sheep with a remedy called " térébenthine-benzol " ; no harm resulted to the animal and the eggs of the liver fluke disappeared from the fæces within three to four days. In order to be more certain of the harmless nature of the drug, the author arranged for extensive tests to be carried out by veterinary practitioners in various parts of France. Ten practitioners, who together used 5,300 capsules of térébenthine-benzol, reported their results and extracts are quoted from eight of these reports. In only two instances were untoward results obtained and in these, for some reason which could not be ascertained, a fatal intoxication resulted. [The history of the poisoning is very similar to that of carbon tetrachloride poisoning.] Out of 6,200 capsules which have now been used to the author's knowledge, only 18 appear to have caused bad results and, in view of the dangerous nature of the disease, the results obtained are considered to compensate for the risks.

In conclusion, the author states that, as a result of his work, he has been able to make known two valuable and cheap remedies for liver rot—térébenthine-benzol and carbon tetrachloride. He also claims that he originated the idea of the prevention and eradication of facioliasis by repeated treatment of infected animals, a principle which may be applied to all diseases caused by parasites. [This principle has been applied for years with great success in the prevention of hæmonchosis in sheep and has more recently been advocated for the prevention of strongylidosis in horses. Carbon tetrachloride may now be regarded as the standard treatment for fascioliasis in many parts of the world.]

E. L. TAYLOR.

CHAUDHURI, G. N. R. (1931). *Eustrongylus gigas* **in the Kidney of a Great Dane Dog.**—*Ind. Vet. J.* **8.** 45-46.

This is a report of the finding of *Eustrongylus gigas* [correctly called *Dioctophyme renalis*] in the kidney of a two year old male dog. For four days before death the dog's temperature remained at between 103° and 105° F. but, prior to that, the dog appeared to be in perfect health.

At *post-mortem* examination a quantity of sanguineous fluid was found in the peritoneal cavity and one kidney was seen to be hæmorrhagic. On cutting into the pelvis of this kidney, the worm, which measured 50 cm. in length, was found.

E. L. TAYLOR.

PRICE, E. W. (1931). **A Note on the Occurrence of Eyeworms in Dogs in the United States.**—*North Amer. Vet.* **12.** No. 11. 49-58. 4 figs., 1 key. [13 refs.]

Up to the present time, only one report has appeared of the occurrence of eyeworms in dogs in the United States. They do not, however, appear to be rare in California and, during the past year, specimens from three cases have been sent to the Bureau of Animal Industry. Two worms were secured from one of these cases, 24 from the second and 28 from the third.

A detailed description is given of the worm, *Thelazia californiensis*, which was briefly described by the author in 1930.

Photophobia, lacrymation and a mild conjunctivitis, which usually disappear after removal of the worms, have been reported as symptoms of infestation in dogs, and it is possible that more extensive injury might follow a heavy infestation of long duration. A more severe conjunctivitis has been reported in dogs infested with the other species, *Thelazia callipæda*, which occurs in this host and very severe symptoms are sometimes associated with the presence of *Thelazia rhodesii* in cattle.

Treatment consists in removal of the worms with forceps after a local anæsthetic has been applied to the cornea.

E. L. TAYLOR.

HARE, T. (1931). **Further Notes on Chronic Tracheobronchitis of the Dog due to** *Oslerus osleri* **(Cobbold 1879).**—*Vet. Rec.* **11.** 1074-1075. 1 fig. [10 refs.]

The lesions in the trachea and bronchi of the dog caused by *Oslerus osler* may be described in two phases :—(1) the *parasitic*, and (2) the *sterile* phase. The author has previously shown that certain lesions of the trachea and bronchi of dogs, formerly described as being of unknown etiology, are the end results of infestation with *O. osleri*. In the present paper, he describes a subject of the sterile phase and gives a detailed account of the lesions observed in the trachea and bronchi.

A symptom of the disease was a chronic dry cough which had persisted for some weeks and had become progressively worse until the dog was destroyed at the owner's request.

Post-mortem examination revealed the presence of a patch of polypoid nodules, densely crowded together in the trachea, varying in size from that of a small pin's head to that of a millet seed. Distributed throughout the mucosa of the bronchi were 113 more nodules ranging in size up to that of a pea.

Attempts to find evidence of the presence of worms by examination of the fæces and of the bronchial mucous for the eggs or larvae were not successful and no trace of the mature worms could be found in the nodules.

The normal termination of this disease is not known, but the author points out that fatal cases have not actually been reported.

E. L. TAYLOR.

REITSMA, K. (1931). Hœ Staat het met de Cysticercosis (inermis) in Nederland ? [**What is the Position regarding Cysticercosis in Holland ?**].—*Tijdschr. Diergeneesk.* **58.** 1026-1046. 1 table. [30 refs.]

As a result of the systematic examination of carcasses at the slaughterhouse at Rheden, the author has come to the conclusion that there is actually an increase in the prevalence of cysticercosis. In 1929, the percentage of infected carcasses was 3·3 and in 1930 it was 5·63. A tabular statement of the percentages of infected carcasses detected at some 40 slaughterhouses shows that the Rheden figure is the highest. It is noteworthy that, while in some places the figure has remained constant for several years, in others there has been a definite variation.

Sources of infection are difficult to trace in many instances, but it would appear that grazing grounds along the banks of rivers are likely to be dangerous. The author emphasises the necessity for effective treatment of the human hosts if the parasite is to be eliminated.

A. LESLIE SHEATHER.

DISEASES, GENERAL.

VAN MIDDELEM, A., & DE JONCKHEERE, J. (1930). La maladie de l'herbe ou Grass disease. [**" Grass Sickness "**].—*Ann. Méd. vét.* **75.** 193-198.

ROBIN, V., & BELLEC, C. (1930). La Maladie de l'herbe " en Bretagne. [**" Grass Sickness " in Brittany**].—*Rev. gén. Méd. vét.* **39.** 385-392. [14 refs.]

RIES, J. N. (1931). Sur le syndrome bucco-pharyngo-œsophagien chez le cheval. [**On the Bucco-pharyngeo-œsophageal Syndrome in the Horse**].—*Ann. Méd. vét.* **76.** 289-302. [18 refs.]

Van Middelem and De Jonckheere publish an account of a disease found in Belgium, which they consider resembles " grass sickness " in Great Britain. It was first observed in Belgium in 1928, but the authors consider that it must have occurred earlier and passed unnoticed.

They describe cases very similar to the subacute type of the disease found in Scotland, a type which occurs later in the season and constitutes 50 per cent. of the total cases. A feature of this type is the marked loss of flesh and the " tucked-up " condition of the abdomen.

[POOL (1928). " Grass Disease in Horses." *Vet. Rec.* **8.** 23. discussed the disease and gave references on the subject. In opening the discussion on the paper by PILLERS (1928). " Labio-glosso-pharyngeal paralysis." (? Botulism). *Vet. Rec.* **8.** 473., POOL (pp. 481-483) gave tables showing the syndrome shown in the three clinically divisible types of " grass sickness " and compared important phases of the syndromes in equine " grass sickness," in " Borna disease " and in botulism.

In the early part of the " grass sickness " season in Scotland (May and June) the majority of the cases are of the peracute or acute types and exhibit more or less abdominal pain and abdominal distention which becomes progressively worse and is frequently followed by vomiting. During this phase of the " grass sickness " season, the type of case exhibiting the subacute course of illness accompanied by " wasting " is rarely seen.]

Robin and Bellec describe a similar condition observed in Brittany, but like Van Middelem and De Jonckheere they do not mention the occurrence of any cases of the acute types. To British observers it will appear a little surprising that only one type of the disease is found in France and Belgium.

It seems rather strange that cases of the peracute or acute types have not been recorded along with those of the other ; it is worth enquiring if practitioners, who are not yet familiar with the many variations of this disease, confuse cases of these acute types with other grave bowel troubles and so do not realise that they are " grass sickness."

Ries refers to the account given by Van Middelem and De Jonckheere and describes a case seen at the Brussels Veterinary College which has every appearance of being a sub-acute case of " grass sickness." He had previously operated successfully on cases of laryngo-bucco-pharyngeal paralysis and was invited

to operate on this case. He did so by making an opening into the œsophagus and inserting a tube to be used for artificial feeding, but the animal died in three weeks.

The other cases he describes suggest rather the recognised endemic bulbar paralysis than " grass sickness " as we know it in Scotland.

These articles do not add to the available knowledge regarding the etiology or therapeutics of the condition. It is to be hoped that the appearance of the disease in new territory will lead to an extension of the investigation.

W. NAIRN.

ISHERWOOD, R. (1931). **An Outbreak of Contagious Pleuro-Pneumonia in Equines.**—*Vet. J.* **87.** 270-272.

The author gives a clinical account of a severe outbreak of pleuro-pneumonia in a stable of horses and mules at Gibraltar. Precise information as to the cause is lacking ; the bare statement is made that diplococci were observed in pleuritic effusion removed by thoracocentesis. The outbreak ended abruptly when animals were picketed in the open.

J. T. E.

ZEEUW, F. A. de. (1931). Overzicht van de Verschillende Pluimveeziekten in Nederland. [**A Survey of the Important Diseases of Birds occurring in Holland**].—*Tijdschr. Diergeneesk.* **58.** 1047-1058. 1 fig., 2 charts.

In this paper, the author records the results of the examination of 1,737 birds carried out at the Utretcht Institute for Parasitic and Infectious Diseases, Utretcht, during the period October, 1929, to October, 1930.

Salpingitis was the cause of the heaviest loss (about 17 per cent.). Coccidiosis and chronic *B. pullorum* infection were each responsible in about 8 per cent. of cases.

Leucæmia, intestinal parasites, neurolymphomatosis, fowl-pox, infectious coryza, tuberculosis, enteritis, tumours and diseases due to faulty metabolism were each responsible in about 5 per cent. of cases, while fowl cholera was diagnosed in rather less than 1 per cent. of the birds examined.

A. LESLIE SHEATHER.

RAUTMANN, H. (1931). Ein Beitrag zur Pathogenese des gelben Galtes. [**A Contribution on the Pathogenesis of Bovine Mastitis**].—*Deuts. tierärztl. Wschr.* **39.** 577-579. 1 table, 2 charts.

KNAUER. (1931). Beobachtungen über die Veränderungen der Milch galtkranker Kühe in ihren Beziehungen zur Käseherstellung. [**Observations on the Alterations in the Milk of Cows affected with Mastitis and their connection with Cheese making**].—*Ibid.* 579-581. 2 tables. [1 ref.]

After giving details of the number of milk examinations made yearly in Saxony from 1926-1930 and the percentage which showed streptococci or increased cell content, the first author discusses the results of infection experiments carried out on 40 cows. These were selected, with due regard to the stage of lactation and yield, from a herd of 100. Previous to artificial infection, four bacteriological examinations were made at weekly intervals, both in the author's laboratory at Halle and in that of Prof. ERNST (Munich) where the methods followed are different.

The 40 cows, about which they were in agreement, were selected as follows :— (1) eight cows with healthy udders ; (2) six with a slight cell increase ; (3) six with a marked cell increase ; and (4) 20 with one or more quarters infected with streptococci. None of the cows showed macroscopical abnormality. All were infected *via* the teat canal, by means of a syphon, with 1 c.c. of a moderately thin suspension from an agar culture of streptococci derived from five cows.

One half of each group was milked normally and the other was specially stripped [number of times daily not given]. The results are given in two charts, one of which refers to milk yield, the other to the clinical findings assessed on a numerical basis. On each chart are four tracings showing respectively the average results for 10 previously infected cows, milked normally after artificial reinfection ; 10 previously infected, but specially stripped ; 10 healthy or doubtful cows milked normally and 10 specially stripped. These charts show clearly that the control of mastitis [at any rate of the type here dealt with] depends very largely upon the milker. Whatever the previous state of the udder, it is clear that thorough stripping has a good effect.

The second author describes determinations of the initial degree of acidity of milk samples, the effect of keeping at about 9° C. and 20° C., and the connection between these and an ability to be coagulated by a standard amount of rennet.

He finds that samples of milk with a low acidity show a prolonged coagulation time and that this approaches the normal as the samples attain a greater degree of acidity. This is the usual result of storage for a short period at room temperature or for a longer period in the cold. Very alkaline mastitis samples may, however, take a considerable time to reach a normal acidity (6-7·5 degrees on the Soxlet-Henkel scale) and many such samples coagulate badly even at this point.

A. W. STABLEFORTH.

DYKSTRA, P. R. (1931). **Infectious Mastitis.**—*Vet. Med.* **26.** 398-401. 1 illustration. [8 refs.]

SWITZER, H. B., & GATES, C. W. (1931). **Field Observations on Mastitis.**—*Cornell Vet.* **21.** 187-189.

The first article is a brief general summary. After some remarks on classification, the author deals with causation, referring to bacteria and predisposing causes such as excessive milk production, thermal influences and trauma. Emphasis is laid on the necessity for recognising the early symptoms which may be very slight and associated with nothing more than minor changes in the foremilk, detectable by milking on to a black cloth on which small flakes or clots show up readily, or by the brom-cresol-purple test.

The mode of spread is thought to be from case to case and, as measures of control, it is suggested that healthy and diseased cows should be kept apart or at least milked separately, that diseased material should never be stripped on to the floor and that milking machines should be used only on healthy cows.

Treatment is believed to be useful, if commenced early, formalin *per os* being recommended. Emphasis is laid on the necessity for frequent removal of diseased secretion and on general good hygiene. Bad cases may be dealt with by injecting the affected quarter with 300 c.c. of 1/1,000 silver nitrate solution, milking out four days later and leaving until the next lactation.

Switzer & Gates refer to work which has been necessitated by the Federal Import Milk Act which requires that all milk sent into the U.S.A. from Canada

shall come from cows which have been clinically examined and declared sound. 150,000 animals within an area of 800 square miles are concerned.

The milk of quarters suspect at clinical examination is tested by BREED's method for cells and a loopful is sown in broth in which, after incubation, long chains are sought. BURRI's method of sowing one standard loop (0·002 c.c.) on agar slants has also been used. Fairly numerous streptococci are generally associated with increased cell count, but the converse does not always hold good.

The main causes of a continued high incidence of mastitis are considered to be retention of diseased animals, bad general hygiene, the introduction of diseased animals from outside and inefficient milking.

It is suggested that the loss due to chronic mastitis is serious and not sufficiently realised, many animals being merely " boarders " ; the possible danger to public health of mastitis due to *S. epidemicus* is also mentioned.

A. W. STABLEFORTH.

LUSH, Jay L. (1930). **" Nervous " Goats.**—*J. Heredity*. **21.** 243-247. 3 plates.

The author reports the peculiar hereditary nervous behaviour which he observed in goats on a farm in Dickens county, Texas, U.S.A. An opportunity to test the manner of inheritance by breeding tests did not occur.

The symptoms seen were occasioned by some form of fright, such as surprise or a loud noise, the animals becoming perfectly rigid or, if moving, falling to the ground. The condition can be described as an unconscious rigidity and the suggestion that the affection is hereditary is supported by the fact that it was seen in Tennessee in some goats which still continued to show the peculiar characteristics when they were moved later to Texas.

G. W. DUNKIN.

GILDING, H. P. (1931). **The Relation of the Nervous System to a Patchy Ischæmia (Bier's Spots) in Animals.**—*Brit. J. Exp. Path.* **12.** 66-69. (6 refs.]

After experimental hæmorrhage, the blood supply to the skin and certain internal organs was found to be irregular and to remain so for periods up to one and a half hours, the phenomenon being studied by a method of vital injection. This paper deals with the nervous mechanism in the production of ischæmic patching which is suggested to be identical with " Bier spots " in man. Various quantities of blood were taken from cats and isotonic solutions of brom-phenol and patent blue V were injected after the induced hæmorrhage. Experiments carried out on decapitated animals showed that a hæmorrhage of 20 c.c. reduced the blood pressure to 30 mm. Hg and the dye injection revealed ischæmic patching of the skin only in those areas where local pressure exerted any influence. In other animals in which decapitation was carried out subsequent to the bleeding and dye injection, the patching was outlined with Indian ink. In these cases, there was no flooding of the unstained areas with dye as was expected after the removal of vaso-constrictor impulses. Raising of the blood pressure by injections of defibrinated blood did not disperse the ischæmia. The muscles in these animals were found to be evenly stained or to have the " mackerel sky " appearance described by ROUS, GILDING and SMITH [(1930). *J. Exp. Med.* **51.** 807.]

After transection of the spinal cord at the ninth to the tenth thoracic level, the patching occurred mainly above the spinal lesion, but true " spots " were observed below in the skin of the abdomen and limbs.

Patching of the skin occurs in the absence of control of the principal vasomotor and spinal centres. This strengthens the assumption that " Bier spots " in man and ischæmic patching in animals are identical phenomena. " Bier spots " can occur in denervated skin). The compensatory vaso-constriction which occurs after hæmorrhage is a predisposing cause of the intense local ischæmia.

J. R. M. INNES.

QUIN, J. (1931). **Photosensitising Influence of Hæmatoporphyrin on Sheep and Goats.**—*17th Rep. Direct. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part II. pp. 645-659. 1 table, 12 figs. [11 refs.] Pretoria : Govt. Printer.

On account of the difficulty experienced in producing cases of " geeldikkop," a disease of sheep and goats commonly caused by grazing on *Tribulus terrestris*, a plant which appears to produce its pathogenic effect only under certain climatic conditions in certain areas, the author decides to investigate the influence of photo-sensitising substances on the sheep. " Geeldikkop " is regarded as definitely associated with photo-sensitisation. In attempting to produce a similar condition, in order to study the symptoms under experimental control, hæmatoporphyrin was tried. The author finds :—

(1) That sheep and goats with unpigmented skins can very easily be rendered photo-sensitive by exposure to sunlight after intravenous injection of 0·5 g. hæmatoporphyrin.

(2) As in " geeldikkop," œdematous swellings were confined to the exposed parts, e.g. head, ears, and sometimes lower parts of the limbs. With the exception of the generalised icterus usually associated with " geeldikkop," the hæmatoporphyrin sensitisation resembled the natural disease.

(3) Animals with patches of pigmented skin showed no ill effects over such parts, while black sheep showed no effects whatever.

(4) Animals kept away from direct sunlight and bright diffused daylight, or placed under cover of hessian, showed no ill effect after injection of hæmatoporphyrin.

(5) Animals could be protected to some extent by artificial pigmentation of the skin (especially with Bismarck brown) of the exposed parts.

(6) In an experiment on Angora goats, window glass was found to cut off only about half of the sensitising rays in sunlight.

(7) Violet rays from a quartz mercury lamp did not produce sensitisation after hæmatoporphyrin injection.

(8) Irradiation with a powerful carbon arc lamp produced definite sensitisation with slight œdema only.

(9) Oral administration of hæmatoporphyrin and subsequent exposure to sunlight, produced no effect.

H. H. GREEN.

HARRISON, S. T., & MELLANBY, E. (1931). **A Note on the Inhibitory Effect of Monoiodoacetic Acid on Lactic Acid Production by Cancer Tissue.**—*Biochem. J.* **25.** 770-772. 2 tables. [4 refs.]

Monoiodoacetic acid (neutralised) inhibits the formation of lactic acid from

glucose by sliced cancer tissue *in vitro*. When injected into mice bearing tumours, the monoiodoacetic acid appeared to have no effect upon the the glycolytic power of the tumour tissue when this was subsequently removed and tested *in vitro*. If the injection causes the animal to become moribund, then inhibition is produced. (One experiment only.)

W. R. WOOLDRIDGE.

GREENWOOD, M., TOPLEY, W. W. C., & WILSON, J. (1931). **Contributions to the Experimental Study of Epidemiology : Further Observations on the Effect of Vaccination on Herd Mortality.**—*J. Hyg. Camb.* **31.** 484-492. 6 tables, 2 graphs. [3 refs.]

A further contribution to a series of articles dealing with experimental epidemics in mice. The infecting agent was *Bact. ærtrycke* and the results of all the experiments are statistically analysed. Two main problems are dealt with, first the course of herd mortality when recruitment is confined to immunised animals and, secondly, comparison of the effects of immunisation by different routes.

The results show that the immunised mice enjoyed a greater expectation of life although restriction of immigrants to immunised animals did not bring the epidemic sickness to an end.

In a further experiment, mice were immunised *per os* and by intraperitoneal inoculation. The immunised mice enjoyed advantages over normal mice, although the mice vaccinated *per os* had a smaller advantage than those vaccinated intraperitoneally.

Examination of certain mice showed that " H " agglutinins for *Bact. ærtrycke* were apparent in the serum of every intraperitoneal mouse tested, whilst the " O " form was only found in about one third of the sera. *Per os* inoculation produced " H " agglutinins in only eight of twenty-three mice, there being no significant difference in the production of " O " agglutinins by oral or intraperitoneal administration.

R. LOVELL.

GURIN, S. S., & EDDY, W. H. (1931). **Is the Rat Dermatitis consequent on Vitamin B_2(G) Deficiency true Pellagra ?**—*J. Exp. Med.* **54.** 421-429. 2 plates, 1 fig. [11 refs.]

Rats were kept on diets adequate in all respects except for source of vitamin B_2(G). A number had vitamin B_2 added in the form of beef extract or of neutral autoclaved yeast. Those animals without B_2 developed a dermatitis similar in appearance to that described by other workers, but histologically different from that found in human pellagra or in black tongue in dogs. The rats that received adequate vitamin B_2 made normal growth, but some of them developed a dermatitis which differed from that found in the other group of animals and, histologically, actually resembled true pellagra lesions. It is concluded that dermatitis in rats may be of diverse types, one resulting from vitamin B_2 deficiency and dissimilar from human pellagra and, another, closely allied to human pellagra and to black tongue in dogs, due to lack of some factor at present unidentified.

W. R. WOOLDRIDGE.

THEILER, A. (1931). **The Pathological Aspect of Phosphorus and Calcium Deficiency in Cattle.**—*Vet. Rec.* **11.** 1143-1146.

THEILER, A. (1931). L'Aphosphorose naturelle et experimentale des Bovidés. **[Natural and Experimental Aphosphorosis of Cattle].**—*Maroc-Médical.* July 15th. 239-242.

The first of these articles is the paper read by the author before Section M of the British Association for the Advancement of Science, Centenary Meeting, London, September, 1931, and is published in abbreviated form in the Sectional Transactions of that Association. An abstract prepared from that source has already appeared [see this *Bulletin*. **1.** 313.].

The second article is a paper delivered before the Society of Medicine and Hygiene of Morocco, and deals with similar material from a somewhat different angle.

The lengthy abstract covering 34 papers from Onderstepoort over the years 1920-1931, which will appear in a subsequent number of this *Bulletin*, and the abstract in this *Bulletin* [**1.** 313.], together provide an adequate review of the material presented. The present papers represent a summary of the pathological aspects of the earlier work.

H. H. GREEN.

KON, S. K. (1931). **The Antirachitic Value of Irradiated Yeast.**—*Lancet.* **221.** 579-582. 7 figs. [13 refs.]

Rats were fed on a standard diet in which irradiated yeast formed the sole source of vitamin D. The preparation obtained under the specified conditions was shown to contain one rat unit of vitamin D per mg. of irradiated yeast as judged by the line test. The preparation was found to retain its activity for at least ten months at room temperature. When an excess of this vitamin, supplied in the form of irradiated yeast, was fed to rats, toxic results were obtained, the rats losing condition and failing to breed at the second generation. Control animals receiving similar diets, except for the substitution of non-irradiated yeast for the irradiated product, were in perfect condition. Non-irradiated ergosterol is said to be non-toxic.

W. R. WOOLDRIDGE.

STAFSETH, H. J. (1931). **Pasty Eyes in Ducklings.**—*J. Amer. Vet. Med. Ass.* **79.** 638-640. [4 refs.]

The author investigated a disease in ducklings, characterised by faulty embryological development and by a primary watery discharge from the eyes which later became mucous in nature and caused the eyelids to stick together. He was unable to incriminate any living causative agent, but found evidence of vitamin A and D deficiency. The addition of cod liver oil to the food of the breeding stock effected a steady improvement and the trouble disappeared in two weeks.

NORMAN HOLE.

IMMUNITY.

HEKTŒN, L., & BOOR, A. K. (1931). **Simultaneous Multiple Immunisation.**—*J. Infect. Dis.* **48.** 588-594. 2 tables. [5 refs.]

Two experiments are described in which rabbits were inoculated simultaneously with approximately equal volumes of 1 per cent. solutions of 14 antigens

and 35 antigens respectively. The antigens included the hæmoglobins of man, monkeys, the domestic animals, rodents, birds and fish ; the serum albumins of man, the horse, ox, chicken and of eggs ; and certain pseudoglobulins, Bence-Jones protein and Hogan protein. The antigen solutions were freshly prepared and reacted with their respective precipitin serums in dilutions of at least 1 : 10,000. The rabbits received five or six intravenous injections of the mixed antigens at intervals of three or four days, the total amount of each antigen received by a rabbit being in the first experiment 25 mg., and in the second usually 6·6 mg., though in some cases it was less. Many animals died, but the survivors, bled on the fourth day after the last injection, gave active sera.

In both experiments, precipitins developed for all except one of the antigens. In both, a reaction was obtained with the mixture used for injection at a dilution of 1 : 1,000,000 ; the reaction with the individual antigens varied, but in many cases it reached 1 : 1,000,000. No reaction was obtained with antigens other than those injected and absorption experiments showed a specificity at least equal to that obtained by injecting single antigens.

The important fact is that, in the second experiment, the total weight of all the antigens, 210 mg., was less than that usually given by the authors when immunising with a single antigen, 300 mg. Yet the precipitin titre for many of the individual antigens was probably not less than is usual after immunisation with single antigens and these individual titres were evoked by a relatively minute amount of the corresponding antigen, 6·6 mg. or less. The authors ask whether it is on account of the primary mass effect that such comparatively minute amounts of single antigens can give such liberal response, or whether the phenomena can be explained by a rapidly developed allergy. In the second experiment in which 24 hæmoglobins were included, the precipitins in one serum varied in titre from 1,000-1,000,000 and these figures bore no constant relation to the weight of injected antigen which was in one case only 0·73 mg., i.e. much below the usual amount. It may be that equal weights of different hæmoglobins or equal weights of different batches of the same hæmoglobin have different antigenic power ; nevertheless, the results serve to emphasise the possibility that, under some circumstances, minute amounts of antigen may evoke liberal response.

The authors incline to the view that the varied antibodies found in the serum of normal individuals may have developed in response to antigens that have entered the blood from the respiratory or digestive tract.

A. W. STABLEFORTH.

HARE, R. (1931). **Studies on Immunity to Hæmolytic Streptococci. III. Observations on the Variation in Resistance to Phagocytosis displayed by Broth Cultures of High and Low Virulence.**—*Brit. J. Exp. Path.* **12.** 261-271. 2 tables, 4 charts. [4 refs.]

The essential purpose of this study was to measure the amenability of cocci, after various periods of growth in 5 per cent. serum broth cultures, to phagocytosis by the leucocytes of normal human defibrinated blood.

Tubes of broth were seeded at intervals from a three-hours old culture in serum stored at 0° C. so as to obtain cultures of various ages for test side by side with one specimen of blood. Standard amounts of defibrinated blood and culture were incubated on a mixing machine for 15 minutes, smears were made and the proportion of cocci taken up by 100 polynuclear leucocytes was calculated. The strains came from cases of puerperal fever and were rendered fully virulent by mouse passage or avirulent by cultivation on plain agar. Growth curves were

made from blood agar counts ; virulence was tested on mice by intraperitoneal inoculation.

It was found that strains virulent for mice became highly resistant during the logarithmic growth phase and remained so until late in the phase of decline, but that, eventually, the resistance disappeared completely. Strains of moderate virulence were less resistant during the active phase and soon became non-resistant. Strains of minimal virulence never became resistant. Resistance to phagocytosis is believed to connote failure of opsonisation. Infectivity would thus seem to depend on two factors :—

I. The growth phase of the cocci at the time of their arrival in the tissues. This governs their resistance at that time and their ability to infect directly.

II. The antecedents of the culture. These govern the ability of non-resistant cocci to beget resistant cocci in serum and so initiate a delayed reaction.

A. W. STABLEFORTH.

SPICER, S., assisted by RACHSTEIN, R. (1931). **A Rapid and Simplified Method for conducting the Agglutinin Absorption Test of Hæmolytic Streptococci.**— *J. Immunol.* **21.** 141-149. [2 refs.]

The author believes that a classification of streptococci for clinical purposes should depend on antigenic properties rather than on metabolic functions, but notes that animal protection tests are cumbersome and expensive and that direct agglutination is not well suited to streptococci, particularly those of the hæmolytic variety.

A description follows of what she believes to be a simple and rapid method of carrying out the agglutinin absorption test. The essential points are the use of a solid medium for culture and of the microscopic slide agglutination technique ; the former obviates washing and gives good suspensions, the latter effects a great saving in time and materials.

Each strain for test is sown from the stock chocolate agar slant to beef heart broth and from this to the surface of vitamin agar in four or five Blake bottles. The following morning the cells are suspended in saline (1·5 c.c. per bottle), and are centrifuged in a calibrated tube for one hour after which they are ready for absorption. Each control strain is similarly treated except that the suspension is divided into two parts. The coarser, first deposited, is separated from the supernatant and is then packed hard ; the supernatant finer part is also further centrifuged to concentrate it and constitutes the antigen used in the final test for evidence of absorption.

The actual absorption is carried out by mixing each deposit with 2·7 times its volume of a 1 : 10 dilution of serum ; according to the author it is exceptional for greater dilution of serum to be necessary. The mixtures are then incubated for one hour at 45° C. and centrifuged. Dilutions are prepared from the supernatant serum and are tested for remaining agglutinins by the microscopic agglutination technique on vaselined hollow ground slides ; agglutination may be immediate or may take from 5-15 minutes.

Forty stock strains, which had previously been tested by an older method, were dealt with in this way with similar results. Five newly isolated strains were also satisfactorily tested.

A. W. STABLEFORTH.

STILLMAN, Ernest G. (1931). **Duration of Demonstrable Antibodies in the**

Serum of Rabbits Immunised with Heat-Killed Type I Pneumococci.—*J. Exp. Med.* **54.** 615-621. 4 text figs. [1 ref.]

The author found that, for the production of antibodies in the serum of rabbits by the injection of heat-killed cultures, the intravenous route is the most effective. Protective antibodies, as demonstrated by animal inoculations, persisted in the blood up to 880 days or more after inoculation, but agglutinins were never detected after the 100th day. No agglutinins at all could be shown when the subcutaneous route was used.

NORMAN HOLE.

FRANCIS, Thomas, Jr., & TILLETT, William S. (1931). **Cutaneous Reactions in Rabbits to the Type-Specific Capsular Polysaccharides of Pneumococcus.**—*J. Exp. Med.* **54.** 587-596. 2 tables. [8 refs.]

The authors describe and discuss the results of a series of experiments in which purified type-specific polysaccharides of the pneumococcus were injected intracutaneously into rabbits actively or passively immunised against the respective pneumococcal types. When the polysaccharide injected was homologous to the immunising organism, an anaphylactic type of skin reaction developed 6-8 hours after injection (in contrast to the immediate weal produced in similarly treated human convalescents from lobar pneumonia) and sometimes reached a stage of purpuric discoloration before regression occurred. Positive skin reactions were obtained in 100 per cent. of passively immunised rabbits and in 84 per cent. of actively immunised rabbits. No skin reactions were observed in guinea pigs, but a mild anaphylactic shock occurred in some of those passively immunised.

The reactions were observed only when type specific capsular polysaccharides were employed and when type-specific precipitins were present in the blood.

NORMAN HOLE.

I. FALK, K. G., VALENTINE, E., MCGUIRE, G., & WHITNEY, E. (1931). **A Study of Antipneumococcus Preparations Before and After Drying.**—*Amer. J. Path.* **7.** 545. [Abstract of a paper given at the Thirty-first Annual Meeting of the American Association of Pathologists and Bacteriologists, Cleveland, Ohio. 2nd and 3rd April, 1931.]

II. FELTON, L. D., & KAUFFMANN, G. (1931). **The Pyrogenic Reaction to Concentrated Antipneumococcus Serums with respect to certain Serum Constituents.**—*J. Infect. Dis.* **49.** 337-347. 5 tables. [11 refs.]

III. BANZHAF, E. J., & KLEIN, A. J. ((1930). **A Practical Method for concentrating Chill-Free Pneumococcus Antibodies from Sera without Use of Salt Precipitations.**—*Proc. Soc. Exp. Biol. N.Y.* **28.** 276-278.

I. After 6 to 12 months' storage of dried antipneumococcal serum in the ice box, the mouse protection units and the agglutinin and precipitin content were either the same or only slightly lower than those of homologous untreated serum. Storage at room temperature, however, reduced the agglutinin and precipitin content very considerably, whilst the mouse protective units fell about one half.

The second and third communications deal with the technical details of the substance present in certain preparations of pneumococcal sera which produce chills when injected intravenously into lobar pneumonia patients.

II. The nature of the water insoluble protein, associated with the antibody of the anti-pneumococcal serum obtained from horses, was studied and it was found that chill-producing samples still contained material precipitable at pH 4·8 to 5·2 in a neutral salt concentration ; such samples also contain a slightly higher phosphorus content.

III. The method advocated is to dilute one part of cold antiserum with three parts of cold distilled water which produces a precipitate. When corrected to pH 5, the precipitate almost dissolves with a reprecipitation of inert protein and the chill-producing substances. This preparation is kept at 5° to 10° C. for four hours, is then filtered and is adjusted to pH 6·8. Trial tubes are set up to determine the amount of distilled water necessary to precipitate the antibodies. The precipitated antibody is allowed to settle overnight in the cold, it is centrifuged and equal parts of 1 per cent. NaCl are added to the precipitate to redissolve it ; the salt content is then brought up to 1·5 per cent. and the preparation is filtered.

R. LOVELL.

FINDLAY, G. M. (1931). **The Fractionation of Anti-Vaccinia Serum.**—*Brit. J. Exp. Path.* **12.** 9-13. 3 tables. [6 refs.]

Anti-vaccinia immune serum prepared in the rabbit was treated with varying quantities of ammonium sulphate and the euglobulin, pseudoglobulin and albumin fractions were separated, washed by dialysis and subsequently tested separately for immune properties. Both the euglobulin and pseudoglobulin fractions possess a protective action against the virus *in vivo* ; they flocculate the virus *in vitro* and increase the phagocytic activity of leucocytes for the virus *in vitro*, but the euglobulin fraction is always the more potent. The albumin fraction possesses little if any immune properties. These experiments show that vaccinia virus is similar to bacteria in that the immune body in bacterial diseases is usually associated with the globulin fraction of the serum.

W. R. WOOLDRIDGE.

FLEISCHER, M. S., & JONES, L. (1930). **Serum Sickness in Rabbits. I. Manifestations of Serum Sickness.**—*J. Exp. Med.* **54.** 597-614. 9 tables, 1 coloured plate. [6 refs.]

Serum sickness in man may follow the injection of a single dose of a foreign protein, usually after a period of 4-12 days. Cardinal symptoms are urticarial or erythematous reactions, less frequent symptoms are fever, arthralgia, swelling of lymph nodes and œdema. An immediate or an accelerated form, appearing within eight or within 24-48 hours respectively, may follow a second injection if there has been sufficient lapse of time.

By injecting rabbits with normal horse serum or various antisera, the authors have produced reactions which they regard as analogous ; these were of an erythematous and often of an œdematous nature and were confined to the ears. 147 normal rabbits, fed and kept under various conditions, were observed for two to seven weeks. Small hæmorrhages apparently due to scratches and transient vascular changes were nearly constant. In a large percentage, there also occurred small areas of erythema which were distinguished from the reactions after serum injection by their discrete nature and small size and, more particularly, because the area affected was limited and usually confined to the upper and outer part of the ear. Œdema was also noticed at times.

103 animals were injected with normal serum and 33 with various antisera. Only those injected with normal serum are considered in this paper. Of these, 71 showed reactions regarded as clearly positive, whilst 32 were taken as negative although, in 13 of them, a reaction of a doubtful nature was seen. The characteristic reaction was a diffuse erythema of a scarlatinal or morbilliform kind, generally affecting both ears, much more extensive than that seen in normal animals and, if not general, usually confined to the lower two-thirds of the ear. Œdema was less frequently noted, being often in one ear only and usually confined to the lower portion.

Reactions were produced with nearly similar frequency by injection into the ear vein, jugular vein, heart, muscles, subcutaneous and subscapular tissue. No reactions were produced in eight animals given 3 c.c. per kg. body weight, but 5 c.c. per kg. produced marked reactions ; there was, however, no increase in severity after 7-10 c.c. Reactions generally appeared on the fifth or sixth day and remained for one to three days, occasionally longer. They were apt to vary in intensity during this period, but never recurred once they had disappeared. Antisera produced similar reactions.

In a small number of animals which received a second injection, three to seven weeks after the first, similar reactions appeared either within eight hours or within 24-72 hours. These are regarded as being certainly analogous to the immediate and accelerated form of serum sickness in man.

A. W. STABLEFORTH

Duhot, E., Polonovski, M., & Cuvelier, R. (1931). L'hypothermie initiale comme critère de l'intensité du choc anaphylactique chez le cobaye. [**Initial Hypothermy as a Criterion of the Intensity of Anaphylactic Shock in the Guinea Pig**].—*C.R. Soc. Biol. Paris.* **108.** 57-59. 1 table. [1 ref.]

Gouveia, V. H. de. (1931). Les mouvements de circumduction dans le choc anaphylactique du cobaye ; leur reproduction par l'injection intracardiaque d'air. [**Movements of Circumduction in Anaphylactic Shock in the Guinea Pig ; their Reproduction by Intracardial Injection of Air**].—*Ibid.* **106.** 565-566.

In an attempt to measure the anti-anaphylactic effect of Vichy water or bicarbonate water, the first authors made use of the sudden drop in temperature which is known to follow the injection of the critical dose of serum. In preference to taking the minimal temperature, they chose to record the extent of the drop which occurred in the first three or four minutes and to express this in relation to the actual time. In guinea pigs which survived, this coëfficient was between 0·2 and 0·5 ; in animals which received a fatal shock it was never less than 0·75 and had reached 1·16.

Twenty-three guinea pigs were sensitised with 0·005 c.c. of antidiphtheria serum ; of these, six were kept as controls, 13 were treated daily with Vichy water and five with bicarbonate water ; in four others, the initial dose was a mixture of 0·005 c.c. of serum and 1·0 c.c. of Vichy water. All were given the second dose 25 days later. The temperature coëfficient was always lower in the animals which survived and the mean of the coëfficients for each of the four groups showed a relation to the mortality which was distinctly higher in the control group (five out of six).

Gouveia points out that circumduction, although nearly constant in anaphylactic shock, may also be produced experimentally by the injection of air intra-

cardially. Amounts from a few thousandths to 1·0 c.c. almost immediately caused movements similar to those seen in typical shock. The animals did not always die.

A. W. STABLEFORTH.

BIER, O. G. (1931). Sur le rôle de l'alexine dans la genèse de l'anaphylatoxine. [**On the Rôle of Complement in the Genesis of Anaphylatoxin**].—*C.R. Soc. Biol. Paris.* **106.** 569-570. [1 ref.]

VALLERY-RADOT, P., MAURIC, G., HUGO, Mme. A., & GIROUD, P. (1931). Anaphylaxie passive. Essais de transmission des anticorps de l'homme au cobaye. [**Passive Anaphylaxis. Attempted Transmission of Antibodies from Man to Guinea Pig**].—*Ibid.* **107.** 1210-1212. 1 table. [1 ref.]

The first author has found by comparative experiments in two guinea pigs that, if one adsorbs the complement from plasma by means of Congo red, the formation of the anaphylatoxin, which ordinarily occurs during contact with 20 per cent. of a 1 per cent. suspension of agar for two hours at 37° C., is not prevented. The adsorption of complement was confirmed by hæmolysis test. Previous experiments showing that the formation of the serotoxin was not caused by a proteolytic action of complement are thus confirmed.

In the second paper the authors note that opinion is divided regarding passive sensitisation. They remark that true anaphylactic convulsions and the typical anaphylactic drop of arterial pressure, which is progressive with slow reascension, must not be confused with the convulsions and the sharp and brief drop in pressure which may follow a first injection of serum. They have tried to sensitise nine guinea pigs passively by the intravenous or intraperitoneal injection of 1-3 c.c. of serum from persons who had been sensitised to various antigens and who showed definite clinical phenomena, a positive skin reaction and a positive Prausnitz-Küstner reaction. Half an hour or 24 hours later, the test dose of 1-2 c.c. of antigen extract was given. In certain cases, a brief and sharp drop of arterial pressure was noted and in one case convulsive symptoms, but no true shock. In future work, a graphic record of the arterial pressure should be made and experiments should be repeated.

A. W. STABLEFORTH.

PUBLIC HEALTH.

MOHLER, J. R. (1931). **Some Activities of the Bureau of Animal Industry.**—*Cornell Vet.* **21.** 114-126.

In this address, delivered at the Twenty-third Annual Conference for veterinarians at Cornell University, Dr. Mohler, Chief of the Bureau of Animal Industry, U.S.A., briefly surveyed the manifold activities of his department.

He pointed out that profitable livestock production is obviously essential for successful agriculture and that, without the intervention of veterinary science, herds and flocks would be decimated by disease to such an extent as to render production unprofitable.

In January, 1930, the value of livestock in the U.S.A., exclusive of poultry, was estimated at $6,000 million which exceeded the aggregate value of all the corn, oats, wheat, rye, barley, buckwheat, potatoes, tobacco and cotton produced in the U.S.A. during the year 1929.

The estimated annual loss from contagious disease suffered by the livestock industry was approximately 300 million dollars and, in the opinion of the author, at least two-thirds of that loss could be prevented if existing knowledge of veterinary science, animal husbandry and sanitation were properly utilised.

The Bureau of Animal Industry is divided into 12 major sections each directed by a senior officer. The total staff consists of 4,326 employees, of whom 1,385 are veterinarians.

Experimental farms are maintained in various parts of the country in connection with disease research and animal husbandry ; the largest of these farms is situated in Montana and comprises 50,000 acres, while the most important, on account of its varied activities, is at Beltsville, Maryland.

The Pathological Division is the oldest established and it formed the nucleus around which the existing organisation has been built.

The Federal Meat Inspection Service which was inaugurated in 1906 supervises the inspection of approximately 70 per cent. of the meat and meat products of the country.

The Tick Eradication Scheme which was started in 1906 has been successful in freeing from ticks over 600,000 square miles or 83 per cent. of the total area infected.

Another Division controls the eradication of bovine tuberculosis, a scheme which Dr. Mohler rightly claims " is the most gigantic undertaking of its kind that has ever been attempted in any country." During the past 12 years the average incidence of the disease has been reduced from 4·9 per cent. to 1·7 per cent. an achievement which has fully justified the courage and foresight of launching this great eradication campaign. Over 75 million tuberculin tests (single intradermal method) have been carried out and nearly 2 million animals have reacted.

[The financial aspect of the scheme is of interest and illustrates effectively the increasing consciousness of the Federal Government of the importance of tackling tuberculosis before it gets out of control as it has been allowed to do in the old world.] The first annual allocation made by Congress was $75,000 which amount has been gradually increased until in the present financial year it reached the sum of $6 million to which must be added $13 million contributed by the coöperating states.

Dr. Mohler says that it has now been decided to include avian tuberculosis in the scheme as that disease causes heavy losses to farmers in the middle western states. This work will have a repercussion on the pig industry as large numbers of pigs are found to be affected with the avian type of tubercle bacillus.

One of the most interesting branches of the Bureau is that which supervises biological products whether prepared in America or imported from abroad. The largest items on the list are anti-hog cholera serum and virus, and the efficiency of the control of these products is reflected in the excellent results obtained and in the confidence shown by stock owners in the serum-virus method of immunisation against hog cholera.

Under the able guidance of Dr. Maurice Hall, the Zoological Division has developed into one of the most important branches of the Bureau. During recent years an increasing interest has been evinced in parasitology on account of the serious economic loss caused by various types of parasitic infestation among mammals and birds. That parasites cause unthriftiness and lack of growth and consequently render the raising of livestock unprofitable is being gradually recognised by stock owners, and Dr. Mohler forsees the time when every state in the Union will have at least one veterinary parasitologist on its staff.

In conclusion the author points out that new disease problems arise more

rapidly than old ones are solved and that, in consequence, the veterinary personnel of the Bureau must be enlarged to meet the increasing demands of agriculture for the assistance of veterinary science.

T. M. DOYLE.

McAllan, James, & Howie, George. (1931). **Milk Hygiene.** Paper presented at 49th Ann. Congr. N.V.M.A. (Great Britain). [Norwich, Aug. 22nd-28th, 1931]. Discussion (but not paper) published in *Vet. Rec.* **11.** 989-995.

The authors discuss four diseases in human beings which are related directly or indirectly to milk infections. It is suggested that the comparative rarity of *Br. abortus* infection in swine may account for the paucity of human cases of undulant fever in Great Britain. In the course of two years, seven definite human cases have been observed in Aberdeen. In one case, *Br. abortus* was isolated from the suspected milk. Another strain isolated from milk grew without the provision of a special atmosphere of carbon dioxide. The authors discuss the possibility of this strain being of porcine origin, but, as the animal from which the sample was obtained had been inoculated with a live culture vaccine of *Br. abortus*, the strain recovered may have been the vaccinal strain.

The authors discuss undulant fever and refer to the general difficulty in reconciling the scarcity of human cases with the heavy infection of milks with *Br. abortus*.

In the course of the discussion on the paper, Begg suggested that the absence of child-infection might be associated with the pre-adolescent state. Barbour described a case of human wound infection, as shown by the agglutination test, but Bosworth was not prepared to accept a positive agglutination test as a criterion of infection.

Food poisoning due to *Salmonella* infections of milk is not common in this country, but the authors mention three cases, two due to *B. enteriditis* and one to *B. ærtrycke*. In one case in which 497 persons were affected, *B. enteriditis* was isolated from the human cases and from the milk and the mammary gland and flesh of one cow from the herd suspected of being responsible for infection. The authors found agglutination testing for *Salmonella* infections in cattle, sheep and pigs unsatisfactory as, either normal agglutins were present, or many of the animals had at some time been infected.

Brittlebank described a probable outbreak of food poisoning which occurred 29 years ago ; it was apparently due to infection from the milk of one cow which proved to have a deep-seated abscess in the udder. Bosworth said that, although he had not met with *Salmonella* infection in milk, three fairly extensive infections had occurred in young calves at Cambridge and it was possible that in these cases the cows were the sources of infection.

The economical as well as the hygienic aspects of the tuberculosis question were widely discussed and the authors consider that frequent and thorough inspections, combined with examination of bulk samples, are the only sure methods of combating tuberculous mastitis. Begg emphasised the danger of urine as a source of infection, gross tuberculous lesions being frequently found in the kidneys.

No case of infection of the udder of the cow with *B. diphtheriæ* has been reported. In one case, however, which occurred in Aberdeenshire, a milker was the source of infection and virulent diphtheria bacilli were recovered from teat sores on the cow.

The authors conclude that higher grade milk production should be encouraged and that other milks should be efficiently pasteurised. The acceptance of pasteurisation was much disputed in the course of the discussion. A resolution was passed to the effect that the members of the Congress were unanimously of the opinion that the routine inspection of dairy herds is essential as a Public Health measure.

NORMAN HOLE.

RUDDICK, J. A., & SINGLETON, J. F. (1931). **The Trend of the Dairying Industry and Trade of Canada.**—*Internat. Dairy Congress, 1931.* [English Edition.] Papers 78-105. pp. 1-8. Copenhagen: Bianco Luno. A/S.

Note.—The proceedings of the Congress have been published in three separate editions—in English, French and German. In each case the papers are given in full in the languages of origin and abstracts only are given in the editions foreign to the language of origin. The pagination of the three editions is special to each.

During the past decade, while the population of Canada has increased by 13 per cent., the cow population has only increased by 10 per cent., but the total milk production has increased by 30 per cent. owing to the various improvements in stock and stock production and management.

There has been a growing tendency to limit the number of dairy factories and to concentrate in a smaller number of large creameries. Grading of butter and cheese has been followed by a marked improvement in quality which again is reflected in the improved prices and has led to trading advantages. In 1923, 78 per cent. of the cheese was graded as special or first grades ; in 1930, 92·59 per cent. reached that standard.

During the past few years, there has been a very great increase in the consumption of dairy products in Canada and, although milk production has also increased very considerably, it has not been sufficient to meet the growing demand. Consequently, exports of dairy products have decreased and imports—particularly of butter—have increased.

She now exports her surplus milk in the more valuable products, viz. milk, cream, ice-cream and evaporated milk, mainly to the United States of America. To-day Great Britain is still Canada's best customer for butter and cheese, but the quantity she imports is diminishing. One half of the total milk production passes through dairy factories, the remainder of the supply being sold for home consumption, ice-cream or creamery butter manufacture by confectioners and private dairy factories. In addition to the fact that there are now more consumers, the increased home consumption is ascribed to a more general knowledge of the nutritive values of dairy products. The dairy and cold storage branch of the Department of Agriculture maintains a service for the dissemination of knowledge on these points.

The marked improvement of milk and its products has done much to increase consumption.

W. NAIRN.

HANSEN, A. (1931). **Stassanisation of Milk.**—*Internat. Dairy Congress, 1931.* [English Edition.] Papers 78-105. pp. 28-36. Copenhagen: Bianco Luno A/S.

This is a method of treating milk by heat which was introduced by Dr.

Stassano of Strasbourg ; it differs somewhat from sterilisation [*sic*], pasteurisation or boiling.

The milk is passed under pressure for 15-16 seconds in a thin layer between two tubes heated with steam to 75° C. There is an inner and an outer tube and the milk circulates in the small space between them ; it is thus shut off from air, and evaporation and other changes are limited. Any slight changes produced are said to be less extensive than those which occur in any other method, while the keeping properties of the milk are increased.

There is no evidence of a boiled taste and the deposit of cream is unaffected. Ordinary water (not a freezing mixture) pumped through the steam tubes is sufficient to cool the milk. The costs for power and heat are less than those of any other method. The ordinary bacterial flora is destroyed almost completely including *B. coli*, *B. tuberculosis* and *Br. abortus*.

W. NAIRN.

Walton, J. H. (1931). **The Colon Bacteria occurring in the Milk Supply at Pusa.** —*Ind. J. Vet. Sci. & Anim. Indust.* **1.** 221-223. 1 table.

The bacterial counts of samples of milk in Pusa showed a distinct rise during the rainy season. Samples examined regularly revealed that, whilst colon bacteria of the MR + [methyl red] VP– [Voges Proskauer] variety predominated during the months from November to February, the MR- VP + types tended to predominate from June to September. Two-thirds of the MR– VP + group were identified as *Bact. ærogenes*, the remainder as *Bact. cloacæ*. The MR + VP– group appeared to consist of various sub-varieties of *Bact. coli*. [It is known that the MR + VP– group is associated with fæcal contamination and the MR– VP + group with soil, yet the employment of the Indol test, Koser's citrate and the cellobiose test should have given more information and should have helped to differentiate that group of bacteria intermediate between *Bact. coli* and *Bact. ærogenes*.]

R. LOVELL.

SPECIFIC DRUG THERAPY.

Parkin, B. S. (1931). **Antimony Therapy in *Trypanosoma brucei* Infection of Horses.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. 61-65. 2 tables. [1 ref.] Pretoria : Govt. Printer.

Parkin, B. S. (1931). **Antimosan Therapy in *Trypanosoma congolense* Infection of Sheep.**—*Ibid.* pp. 67-76. 9 tables, 3 charts.

These two articles, both dealing with the use of antimosan in trypanosomiases, continue the studies of the author upon the drug [(1930). " Antimony Therapy in Equine Trypanosomiases (*T. brucei*)."—*16th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* pp. 55-59].

The object of the work recorded in the first paper is to determine the size of the dose and the most desirable intervals between administration. Five horses are used and the value of the data is enhanced by ringing the changes on dosage and interval.

Of the five horses, the infection was effectively sterilised in three—one with six doses of 5·25 g. at intervals of three weeks, another with eight similar doses at intervals of two weeks, and a third with three doses ascending 3 g., 6 g., and 9 g., at weekly intervals.

The method of testing sterilisation of infection is discussed in relation to blood smear examination, re-infection tests, blood sub-inoculation, and complement fixation tests. Smear examination alone is very deceptive—one of the horses only showed *T. brucei* once in 13 weeks although tested three times weekly.

In the second paper, the experiments on ovine *T. congolense* infection cover 63 sheep. The conclusions are :—(a) that the probable effective dosage of antimosan would be 1·2 g. [10 c.c. of a 12 per cent. solution of the sodium salt used] repeated once or twice at intervals of 28 days ; (b) that a similar dosage at seven day intervals would probably produce sterilisation, (c) that 5 c.c. gave unsatisfactory results although 7 c.c. gave good results ; and (d) that the practical dosage is the " 10 c.c. repeated."

The approximate dosage per kg. live weight [corresponding to this 10 c.c. dose] is 0·03 g. antimosan.

H. H. GREEN.

PARKIN, B. S. (1931). **Styrylquinoline No. 314 in Trypanosomiases.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. 77-82. 1 table, 2 charts. [2 refs.] Pretoria : Govt. Printer.

A paper dealing with the use of the compound named [*vide* foot-note] in *T. brucei* infection of horses (strain obtained from a natural case of the disease in a donkey, and tested for virulence) and in *T. congolense* infection of bovines. The drug was used in solution in water, saline, or 10 per cent. glucose.

Conclusions are as follows :—

(1) Styrylquinoline No. 314 is an efficient sterilising agent for use in *T. brucei* of horses when used at a dosage of 0·004 g. per kilo. body-weight repeated more than twice at weekly intervals.

(2) It does not, however, appear to have any therapeutic action in *T. congolense* infection of bovines.

(3) Subcutaneous injection produces marked irritation of the tissues both in horses and in bovines. When given intravenously it produced toxic symptoms in horses.

The author regrets that the excellent results in sterilising *T. brucei* infection should lose part of their value through the fact that the destruction of tissues below the site of inoculation is often alarming. Injection of the solution in small quantities at a number of sites resulted in only slight swellings, and swellings were only minor when the drug was given subcutaneously in sterile olive oil.

NOTE.—Derivatives of anil- and styryl- quinolines were introduced for the treatment of trypanosomiasis by BROWNING, C. H., COHEN, J. B., ELLINGWORTH, S., and GULBRANSEN, R. [(1926). " Aminostyryl quinoline and aminoanil quinoline compounds."—*J. Path & Bact.* **29.** 317., and (1929). " The trypanocidal action of some derivatives of anil and styryl quinoline."—*Proc. Roy. Soc. B.* **105.** 99.].

These authors used rabbits and mice as experimental animals, and Prowazek's and *ferox* strains of *T. brucei*. They found that the anil quinolines had little trypanocidal effect although they possessed powerful bactericidal properties, but that some of the styrl quinolines with weak bactericidal action showed quite trypanocidal effect. Of the compounds prepared No. 90, or 2–)*p*- acetyl-amino-styryl)-6 dimethyl-amino-quinoline methochloride, and No. 8 or 2– (*p*-amino-styryl)-6 acetyl-amino-quinoline methochloride, were amongst the most actively trypanocidal although they had no prophylactic action.

No. 314, the one used in the Onderstepoort trials recorded in the paper abstracted above, is similar to No. 90—the methosulphate instead of the methochloride—and tests on the larger domesticated animals were arranged between P. J. DU TOIT [Director of Veterinary Services] and C. H. BROWNING.

H. H. GREEN.

QUASTEL, J. H. (1931). **Trypanocidal Action and Toxicity to Enzymes.**—*Biochem. J.* **25.** 1121-1127. 3 tables. [2 refs.]

A number of compounds possessing trypanodical action, such as trypan-blue, trypan-red, Bayer 205, naphthylamine-disulphonic acids and their s-carbamide derivatives, have been examined for inhibitory action to fumarate. [Fumarate is an enzyme widely distributed in plant and animal tissues and in bacteria ; it acts on fumaric acid forming malic acid]. A parallelism is shown to exist between the inhibitory power of these substances for the enzyme and their trypanocidal activity and also for their substantive properties to cotton. It is suggested that the fumarate enzyme, cotton fibre and the trypanosome must possess some structure in common to account for this specific combination or adsorption. Fumarate or proteins diminish or eliminate the toxic action of these substances for the enzyme.

W. R. WOOLDRIDGE.

PARKIN, B. S. (1931). **Treatment of Piroplasmoses with T.21.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part I. 27-43. 2 tables, 11 charts. [1 ref.] Pretoria : Govt. Printer.

T.21 belongs to a series of compounds [in the experimental stage] made by " Chemische Fabrik vorm. Sandoz," Basel, and supplied to Onderstepoort for trial. THEILER has issued a report upon T.18 and T.19 [THEILER, A. (1930). " Un nouveau medicament pour le traitement des piroplasmoses."—*Bull. Soc. Path. exot.* **23.** 506-529.] which are preparations of trypan blue combined with sodium cholate. The composition of T.21 is not specified [but is presumably similar].

The author tested the efficacy of the compound on bovine piroplasmosis, equine nuttaliosis, and canine piroplasmosis. His results show that for the first the treatment is very satisfactory, for the second very promising, and for the third satisfactory but not markedly superior to trypan blue. Doses for cattle varied from 0·5 g. to 3·0 g., and for horses 1·5 g. to 2 g. Treatment with either T.21 or trypan blue did not interfere with the subsequent use of either in relapse cases.

H. H. GREEN.

GRAF, H., & RIEDEL. (1931). Ueber die Wirkung von Tartarus stibiatus und Chinosol auf die Askariden des Pferdes. [**The Action of Tartar Emetic and Chinosol on the Ascaris of the Horse**].—*Schweiz. Arch. Tierhlk.* **73.** 226-237. 2 figs., 4 tables. [9 refs.]

The authors made a study of the action of tartar emetic and chinosol on *Parascaris equorum, in vitro,* using a kymograph and making observations on live worms kept at body temperature in weak solutions of the test substances.

Controls were run along with each test so that the action of the drugs could be distinguished from that of Bunge's solution (1 per cent. sodium bicarbonate and 1 per cent. sodium chloride in water) or Ringer's solution or distilled water which were used as testing media.

Results showed that tartar emetic exerts only a temporary excitant action on the worms and does not kill as, even after the worms have been brought to a condition of exhaustion, recovery can take place. Their vitality and their normal reactions are, however, impaired so that they are easily expelled by the increased peristalsis which results from the stimulating action of tartar emetic on the intestine of the horse.

Chinosol was shown to liberate oxychinolin in an alkaline medium, such as it would be subjected to in the small intestine. The authors, therefore, tested the anthelmintic properties of oxychinolin, an emulsion of olive oil and castor oil being used as a testing medium because of the relative insolubility of this substance in water. It was found that oxychinolin has an even more powerful action of a cramping nature on the worms than has chinosol and that it acts quickly because of the readiness with which it penetrates the body wall of the worm.

It is thought that chinosol would be of little use as an anthelmintic drug because it is too easily absorbed and disappears from the intestine before reaching the site of the worms, but oxychinolin seems to be more promising and may be worth adopting for use in veterinary practice.

E. L. TAYLOR.

WRIGHT, W. H., BOZICEVICH, J., & UNDERWOOD, P. C. (1931). **Critical Tests of Miscellaneous Drugs as Anthelmintics for Ascaris, Whipworms and Nodular Worms of Swine.**—*North Amer. Vet.* **12.** No. 6. 27-35. 5 tables. [15 refs.]

At the present time, oil of chenopodium is the only satisfactory single treatment for the removal of ascarids from pigs and no effective treatment is known for nodular worms and whipworms. Chenopodium appears to be sufficiently safe to warrant its general use so long as it is accompanied by a sufficient dose of castor oil, at least two ounces per 100 pounds of body weight. There have, however, been frequent reports of bad results following its administration in cases where the contra-indications have been overlooked. For these reasons, the authors have tried to find a more suitable anthelmintic for general use in the pig and, in this paper, they give an account of several experiments which have been carried out at various times during the past few years.

Thirty-three pigs were used in these experiments, 20 as test animals for hexylresorcinol, four for 2-chlorpentane, three for tetrachlorethylene, two for N-butylchloride and four for tung oil. The tests with 2-chlorpentane indicate that it is not effective for the removal of ascarids, whipworms or nodular worms. N-butylchloride removed one out of seven ascarids from one pig and three out of four from another, but had no action on the numerous nodular worms present. Tung oil (from *Aleurites fordii*) was shown to be practically inactive against ascarids, whipworms and nodular worms. Tetrachlorethylene removed two out of 84 ascarids from one pig, one out of six from another and six out of eight from a third, but showed little action against nodular worms. Hexylresorcinol was shown to vary in efficiency from 25 per cent. to 100 per cent. for ascarids. It is of some value for whipworms and appears to be rather more effective in the treatment of swine for nodular worms than are the other drugs which have been used ; in some tests, there was no demonstrable action, but in others all the worms were removed.

It is concluded that oil of chenopodium is still the most effective drug for the removal of ascarids and that no drug is known which is cheap, safe and effective for the removal of whipworms and nodular worms ; apart from its variable efficiency, hexylresorcinol is too expensive for general use.

E. L. TAYLOR.

ALLEN, A. W., & WRIGHT, I. S. (1931). **Determination of the Value of Antiseptics.**—*J. Amer. Med. Ass.* **96.** 920-925. [19 refs.]

The authors criticise the old methods of testing the efficiency of antiseptics ;

they urge the need for a new system and put forward a proposal for such a system.

The Rideal-Walker and other similar tests are now recognised to be of very little value in the estimation of germicidal efficiency for a number of reasons. The phenol coëfficient, estimated formerly with cultures of *B. typhosus*, does not take into account the great variation in the optimum dilution of the different disinfectants now available ; it is valueless where other organisms are concerned and makes no allowance for the different media in which, in practice, it is necessary to deal with the infective organism.

In order to arrive at a useful estimation, it is necessary that an antiseptic sold for any particular purpose should be tested by a standard method employing bacteria of the group of organisms against which it will be used in practice ; the test should be carried out under conditions similar to those which are present when the antiseptic is in actual use.

The authors recommend the adoption of the Reddish phenol coëfficient method, employing *B. typhosus*, *Staphylococcus aureus*, *Corynebacterium diphtheriæ*, *Mycobacterium tuberculosis*, *Diplococcus pneumoniæ* and *Streptococcus hæmolyticus*, separately, according to the proposed use of the preparation under test. For the determination of the penetrating powers of an antiseptic and its behaviour in the presence of blood and serum they recommend the use of Himebaugh's agar cup plate method. In this method an antiseptic solution is placed in a central cavity cut in an inoculated Petri dish culture and its bactericidal and penetrating effects are observed. For the determination of the behaviour of the antiseptic in massive infections, they recommend their own massive infection method. They also suggest that tissue culture and animal experimentation should find a place in this work in the future.

Details of the various procedures are given.

J. T. E.

POISONS AND POISONING.

de Kock, G., du Toit, P. J., & Steyn, D. G. (1931). **Studies on the Aetiology of Dunsiekte or Enzootic Liver Disease of Equines in South Africa.**— *17th Rep. Direct. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part 2. pp. 617-639. 4 tables. [9 refs.] Addendum by the Division of Plant Pathology. pp. 639-644. 2 drawings. 1 map. Pretoria : Govt. Printer.

The paper opens with a critical discussion of " dunsiekte " or so-called enzootic cirrhosis of equines, and discusses the earlier views of Theiler (1918) who could not see his way to incriminate *Senecio* sp. specifically, and who dealt with his own experience in South Africa in relation to the views of Verney (1911) and Robertson (1906) ; also to the views of Gilruth (1903) who studied a similar disease in New Zealand, and accused *Senecio jacobea* as causal agent.

They then correlate the known data with the work of Van Es (1929) on a horse disease in North-west Nebraska—" walking disease," essentially a necrobiosis and cirrhosis of the liver, and experimentally reproducible by feeding with *Senecio ridellii* (eaten naturally in the youngest stages, but not eaten when the plants are of a size large enough to set them apart from the surrounding vegetation).

The " walkabout disease " of North-west Australia, ascribed to *Atalaya hemiglauca* by Murnane and Ewart (1928), is compared with " Winton disease " of New Zealand, " walking disease " of Nebraska and " dunsiekte " of South Africa ;

and with the cirrhosis of the liver of horses in Ireland discussed by CRAIG, KEARNEY and TIMONEY (1930). The views of JALVING (1928) who suspects *Senecio jacobea* and *Senecio aquaticus* as the cause of enzootic cirrhosis in bovines in Holland, are also discussed in relation to THEILER'S views on the extent to which *Senecio* sp. are naturally eaten in South Africa.

The authors then detail their own plan of experiments designed to elucidate :—

(a) The question of Senecio poisoning in the Union of South Africa in all its phases—distribution of species, toxicity of various species, influence of stage of growth and of local conditions upon toxicity, influence of overstocking upon preponderence of Senecio.

(b) The susceptibility of the horse—individual variation in natural consumption of the plant, and individual susceptibility to the toxin.

(c) Contributory causes—climate, pasture, water-supply, parasitism.

(d) The causation of " dunsiekte "—to ascertain whether the symptoms and pathological changes caused by Senecio poisoning are identical with those of the naturally occurring disease.

The paper now published is a preliminary communication on the ætiology of the disease, based upon field experiments at Kokstad combined with laboratory experiments at Onderstepoort. The results, to date, are as follows :—

(1) In view of the unconvincing evidence of field experiments it is not yet possible to conclude that Senecio poisoning and " dunsiekte " are etiologically identical. Nevertheless many control horses from the Kokstad area [Senecio abundant] showed liver lesions when killed, although these horses during life had not revealed symptoms—an observation regarded as significant in regard to quantities of plant probably ingested by horses, and the association between a " dunsiekte " farm and a Senecio area.

(2) By forcible administration of Senecio, cases were produced which could not be distinguished from " dunsiekte," and the resemblance between the disease and Senecio poisoning is stated to be symptomatically and pathologically very close.

(3) In many instances relatively small quantities of the plant in the pre-flowering stage were sufficient to set up acute fatal cases of Senecio poisoning.

(4) From the field experiments it was concluded that neither dipping (against external parasites) nor the elimination of Gastrophilus larvæ affected the incidence of " dunsiekte."

(5) Horses which have shown slight symptoms of " dunsiekte " may recover without leaving evidence of liver changes (cases killed for examination) while, on the other hand, horses which have never shown definite symptoms of the disease on a " dunsiekte " farm may reveal definite liver lesions when subsequently destroyed. The appearance of symptoms is regarded as depending upon the destruction of a definite amount of liver parenchyma.

In the addendum to the paper, supplied by the Division of Plant Industry, Pretoria, the botanical identification of different species of Senecio is discussed.

On the experimental farm near Kokstad six species were collected—*S. retrorsus*, *S. othonniflorus*, *S. adnatus*, *S. isatideus*, *S. harveianus*, *S. fraudulentus* ; also an undescribed species. It is pointed out that the name *Senecio latifolius* has been used somewhat indiscriminately in the past and has probably caused confusion in earlier feeding tests. Two new species *S. pachythellis* Phill. and Smith, and *S. inophyllus*, Phill. and Smith, are described. In all, eleven South African species are discussed, and a map is given showing the geographical distribution of five of these.

H. H. GREEN.

PHYSIOLOGY.

GUHA, B. C. (1931). **Observations on Certain Factors Necessary for the Normal Nutrition of the Rat.**—*Biochem. J.* **25.** 960-971. 2 tables, 6 figs. [22 refs.]

Rats kept on diets apparently satisfactory from the point of view of the known vitamins, including B_1 and B_2, and observed over a long period reach a stage of arrested growth. By the addition of fresh yeast or fresh milk at this period, growth again takes place. Further experiments show that the milk and the yeast factors are not the same. It is concluded that yeast and milk contain factors, other than vitamins B_1 and B_2, which are essential for the normal nutrition of the rat. The factor present in milk is different from the vitamins A, D, C or E, and it cannot be replaced by lactalbumin or the essential amino-acids. The milk factor is destroyed by autoclaving and is therefore not inorganic. This factor is also present in egg yolk, egg white, spinach, grass and alfalfa. Male rats respond better to the addition of this factor than do females.

W. R. WOOLDRIDGE.

MESSNER, H., & PENITSCHKA, W. (1931). Ueber Verschiedenheiten in Farbe und Bau der Pancreaslymphknoten des Rindes. [**On the Variations in the Colour and Form of the Pancreatic Lymph Glands of Cattle**].—*Prager Arch. f. Tiermed.* **11.** 96-104. 4 figs. [8 refs.]

Having noticed that a small number of cattle possess reddish-coloured pancreatic lymph glands, the authors examined these glands in 246 adult cattle and 193 calves which had been killed for meat and veal. Ninety-four per cent. of the glands were pale and, of the remaining 6 per cent., half were red and half were mixed (pale and red).

Histological examination of the glands showed that the variation in colour depended upon the structure ; the reddish glands had a strong connective tissue framework, whereas the pale glands had a weaker framework and a weaker capsule. It is stated that the red lymph glands were not hæmolymph glands.

J. T. E.

LOUW, J. G. (1931). **Preparation of Cystine.**—*17th Rep. Dir. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part II. pp. 473-474. [2 refs.] Pretoria : Govt. Printer.

A chemical paper dealing with the preparation of cystin for use in the nutritional experiments of DU TOIT and co-workers, upon the significance of this sulphur-containing amino acid on the growth of wool.

The method is a modification of that of FOLIN [(1910). *J. Biol. Chem.* **8.** 9.] and claims to effect preparation of a product free from tyrosine, at about one-third of the cost of the commercial product. The source is wool itself and scraps are hydrolysed with concentrated hydrochloric acid, and the hydrolysate partially neutralised with caustic soda. The impure cystin separating out is redissolved, clarified with charcoal and precipitated with ammonia at pH 3·6. Further purification can be undertaken if desired. The method is a matter of observing the precise procedure recorded.

H. H. GREEN.

HŒRR, N. (1931). **The Cells of the Suprarenal Cortex in the Guinea Pig. Thei**

Reaction to Injury and their Replacement.—*Amer. J. Anat.* **48.** 139-198. 7 figs. on 4 plates. [57 refs.]

A histological study was made of the effects of disease and toxæmias on the cells of the suprarenal cortex and on their regeneration. Fixation of the gland was carried out in Bensley's modification of Helly's formalin-Zenker fluid and sections were stained by various methods. A detailed description of the normal histology of the cortex is given and a study is made of the reaction of the cells to chloroform poisoning, diphtheria toxin, mustard gas, scurvy, cauterisation, ligature of blood vessels, and removal of part of the gland.

The cells of the suprarenal cortex have a short life, continually dying off in the *zona reticularis*, being replaced by cells formed at the junction of the *zona glomerulosa* and fasciculata. Degeneration occurs by cytolysis or by shrinkage and pycnosis, the early stages of the so-called light and dark cells. Cells of the *zona reticularis* are susceptible to injury because they are senescent and highly differentiated, are poorly supported by connective tissue and have a large blood supply. The rate of cell destruction and proliferation is described ; it can be greatly accelerated by toxins, bacterial suspensions, and metallic poisons. If heavy dosage is employed, severe lesions may result, repair taking place in about four weeks ; when the lesions are less severe, recovery is rapid by removal of necrotic debris by polymorph infiltration in acute stages, but mainly by monocytes, plasma cells and lymphocytes, and replacement by sound cells. In a lesser degree, this process occurs physiologically.

J. R. M. INNES.

FRIEDHEIM, E. A. H. (1931). **Pyocyanine, an Accessory Respiratory Enzyme.**—*J. Exp. Med.* **54.** 207-221. 10 figs. [7 refs.]

Pyocyanine, the blue pigment produced by *Bacillus pyocaneus*, is readily reduced to its colourless form by the exclusion of air from a culture of the organism but, on shaking with air, the blue colour is restored. In order to test whether this pigment actually accelerates the respiration of bacteria, measurements have been made of the oxygen uptake in the presence and in the absence of pyocyanine. Cultures of the organisms, free from the pigment, were obtained by growth at 30° C. on Lemco agar. The bacteria were washed free from nutrient substances and were suspended in phosphate buffer solution. The oxygen uptake of such a suspension of bacteria was measured in a Warburg microrespirometer. In the absence of simple metabolites, such as glucose, pyruvic acid, etc., a small but appreciable oxygen uptake is registered between 18° and 24° C., an uptake that is very greatly increased by the addition of M/15,000 pyocyanine. The increased respiration due to the pigment is not nearly so great at 37° C., whilst previous heating of the organisms for one hour at 56° C., or the addition of toluene, completely arrests all oxygen uptake either in the presence or absence of the pigment. The results are much the same over a range of pH from 5·3 to 7·7. If glucose or pyruvic acid be added, a large increase in oxygen consumption is obtained and this remains practically unchanged by the addition of pyocyanine. The oxygen uptake is inhibited in the presence of potassium cyanide or of carbon monoxide whether the pigment is present or not. The oxygen uptake of suspensions of *Staphylococcus aureus*, of *Pneumococcus* type III, and of the red blood corpuscles of the rabbit, was also increased by the addition of pyocyanine, but no oxygen consumption occurred with *B. tetani* suspensions.

Pyocyanine, by virtue of its ready reduction and re-oxidation, acts as an accelerator of cell respiration, but its activity is dependent upon the presence

of a system that is inhibited by carbon monoxide and potassium cyanide (WARBURG'S enzyme) on the one hand and by the presence of certain substances closely associated with the bacterial bodies on the other.

W. R. WOOLDRIDGE.

WALLEN-LAWRENCE, Z., & DYKE, H. B. van. (1931). **The Gonad Stimulating Substance of the Anterior Lobe of the Pituitary Body and of Pregnancy Urine.**—*J. Pharmacol.* **43.** 93-124. 15 tables, 2 figs. [33 refs.]

The authors review previous work on the relation of the hormone [or hormones] of the anterior lobe of the pituitary to gonad function. The present investigation deals with :—(a) the technique of assay ; (b) the potency and stability of pituitary implants and extracts ; (c) methods of making potent extracts ; (d) the heat stability and dialysability of extracts ; and (e) an attempt to indicate a clear cut difference between extracts of the anterior pituitary lobe and the urine in pregnancy. The term " hebin " is used as being synonymous with the active principle.

Immature rats were employed in the assay. Quantitative evaluation of the potency of the extracts in the female was based primarily on the weights of both ovaries after subcutaneous injection of extracts. [Considered to be more accurate than describing impressions of follicular maturation and luteinisation]. In the case of the male, the weights of the seminal vesicles were used. Intraperitoneal implants of fresh rat pituitaries, used to determine the stability of " hebin " showed that activity was retained after keeping for 24 hours in a moist atmosphere at 4° C., but was destroyed after freezing for 9 to 36 days. Extracts of fresh rat pituitaries, made by placing in 70 per cent. alcohol, followed by grinding the suspension and then placing the residue in m/5 sodium acetate-acetic acid buffer, pH 4·5, showed that 1 c.c. of the buffer extract was equivalent to 25 g. of the fresh gland. The extract was still active after standing for two months at pH 4·5.

Attempts to extract hebin from fresh ox and sheep anterior lobes by this method gave negative results for ox, but positive results for sheep glands. Desiccated sheep gland could be used in place of fresh tissues. Details of the preparation of sheep hebin, modified on the above, are given ; it was shown that 2·5 mg. of the extracted powder was equivalent to an effective dose of 50 mg. of the original desiccated sheep gland. Pig pituitaries were found to be superior to ox as a source of the hormone. A hormone causing changes typical of the acid extracts of other authors (follicular maturation, luteinisation, uterine hypertrophy and *œstrus*) was obtained from sheep glands at an alkaline pH. Sheep pituitary hebin did not pass through parchment and collodion membranes and the extract was stable at 60° C. after one hour, and after boiling.

A gonad-stimulating hormone was isolated from the urine of pregnancy (human) and from the urine of patients with chorion-epithelioma and hydatidiform mole. [It has been suggested that the anterior lobe pituitary has some causal relationship to the formation of these neoplasms in the human being. The hormone has also been found in the urine of men with certain testicular neoplasms, FERGUSON, R. S., DOWNES, H. R., ELLIS, E., & NICHOLSON, M. E. (1931). *Amer. J. Cancer.* **15.** 835.]. Urinary hebin was not dialysable and was destroyed by boiling, but was not seriously injured when kept at 60° C. for one hour ; it was inactivated under conditions which did not inactivate pituitary hebin.

A larger effective dose of pituitary hebin was required to stimulate the male gonads. Pituitary hebin initiated *œstrus* in hypophysectomised rats.

Brief anatomical descriptions of the ovarian and uterine changes are given.

The theory that both the anterior lobe pituitary and pregnancy urine contain two substances affecting the ovary, one causing follicular maturation, the other luteinisation, receives no support from this paper. It is suggested that minimal effective doses cause relatively more follicular maturation than luteinisation. It was not possible to distinguish the effects of rat and sheep pituitaries and pregnancy urine. The source of the gonad-stimulating principle of pregnancy urine has not been proved, but the evidence points to an extrahypophyseal origin ; there is no evidence of sex specificity of urinary and pituitary hebin.

J. R. M. INNES.

QUINLAN, J., & MARE, G. S. (1931). **The Physiological Changes in the Ovary of the Merino Sheep in South Africa, and their Practical Application in Breeding.**—*17th Rep. Direct. Vet. Ser. & Anim. Indust., Union of S. Africa.* Part III. pp. 663-703. 14 tables, 2 coloured plates. [22 refs.] Pretoria : Govt. Printer.

The object of this report, as stated by the authors, is to clear up the cause or causes of sheep repeatedly returning to the ram.

A full description is given of the factors influencing œstrus, its duration, occurrence, the changes in the ovary during œstrus and their influence on its duration, followed by a description of the changes in the ovary during the inter-œstrus period.

The state of pregnancy in merino ewes is dealt with in a very concise manner and this part of the report contains a description of the changes observed in the ovaries during pregnancy and early lactation.

The text is lavishly interspersed with descriptive tables which are of considerable assistance to the reader.

There are two appendices, the first describes the authors' observations on the ovaries of 21 ewes during the œstrus cycle, and the second describes similar observations on the ovary during pregnancy and early lactation of some 12 ewes. Each of the appendices is illustrated by an excellent coloured plate descriptive of the changes taking place.

G. W. DUNKIN.

ROMANOFF, A. L. (1931). **Growth and Chemical Composition of Ovum of functioning Fowl's Ovary.** (*Gallus domesticus*).—*Biochem. J.* **25.** 994-996. 2 tables. [6 refs.]

Ova obtained from the oviducts of White Leghorn hens in May and June were examined for shape, size and chemical composition. The elasticity of the vitelline membrane diminishes as the ovum increases in size. The growth phases, and especially the maturation phase, are marked by a rapid increase in the percentage of dry matter, reaching the highest value in the mature ovum. With the advance of maturation the calcium and fat contents of the ovum increase proportionately, but the density and pH of the ovum and the iodine value and refractive index of the extracted fat exhibit little change.

W. R. WOOLDRIDGE.

HOLTON, S. G., & BENSLEY, R. R. (1931). **The Functions of the Differentiated Parts of the Uriniferous Tubules in the Mammal.**—*Amer. J. Anat.* **47.** 241-276. 2 plates. [29 refs.]

In any investigation concerning urine secretion, two methods are available :—

(a) by studying the phenomena concerned with the elimination of dyes by the kidneys, and (b) by examination, through the agency of the micro-pipette, of the fluid from single capsules of Bowman. Other investigators, utilising the first method, contend that the dyes used (indigo-carmine and iron) emerge by way of the tubular epithelium exclusively, whereas those utilising the second method demonstrate the presence of both substances in the glomerular filtrate.

While both groups of investigators agree that these substances are observed in the tubular epithelium, those of the first group state that the presence of these substances is due to their passage through the tubular wall and those of the second group contend that the dyes were there on their way down the tubular lumen. The general conclusions reached were that total excretion is effected by filtration through the glomerular tuft, the tubules being concerned in the modification of the filtrate by relative resorption. The theory relating to the latter stage of the process can no longer be entertained.

Holton and Bensley investigated the following questions :—Does the mammalian kidney continue to eliminate substances in solution under conditions in which there is no possibility that glomerular filtration occurs ? Where does elimination take place ? Is there resorption by the uriniferous tubules and what differentiated portion of the tubule is concerned in this function ?

Experiments were conducted on the elimination of iron and indigo-carmine by the kidneys of the rabbit at low blood pressures and in dehydrated animals. Fixation of the kidney after death was carried out by perfusion through the aorta, the low blood pressures being induced by pithing.

In the pithed animals, the blood pressure falls below the osmotic pressure of the blood proteins.

Iron salts were injected into the ear vein and the kidneys of different animals of a series were removed at intervals of ten minutes. Iron was demonstrated in some of the proximal convoluted tubules throughout the cells and in the lumina in diffuse punctate form, very little or none at all was demonstrable elsewhere and none was to be found in Bowman's capsule. Indigo-carmine was found in the lumina of the proximal convoluted tubules, but none was found in the glomerular tufts, distal tubules, ascending or descending limbs, or in the collecting tubules.

Elimination was carried out at levels of low blood pressure at which glomerular filtration was impossible, so that it cannot be reconciled with the theory that iron emerged from the glomerulus and was concentrated at and reabsorbed in the proximal tubules. At levels of low pressure, equal to or less than that of the plasma colloids, urine formation was tubular. The absorption of water took place in the ascending limbs of Henle's loop and in the distal convoluted tubule and not in the proximal convoluted tubule (according to the filtration—resorption hypothesis).

The dehydration experiments confirmed the locus of resorption. It was found that secretion took place in the proximal convoluted tubule and this confirms the work of Stieglitz (1921), Oliver (1912), and Lusuki (1912). The renal unit was thus considered to be :—(1) the glomerulus and capsule as a filter ; (2) the proximal convoluted tubule as the secretory part ; and (3) the loop of Henle, the distal convoluted tubule and duct system, as the seat of resorption.

J. R. M. INNES.

Sheehan, H. L. (1931). **The Deposition of Dyes in the Mammalian Kidney.**—*J. Physiol.* **72.** 201-246. 4 tables, 5 figs. [31 refs.]

As the Cushny theory rejects secretion by the tubule cells, the reduction

in the percentage of a substance in the blood during its passage through the kidney is a direct measure of the percentage of plasma filtered. In clinical work, the renal excretion of abnormal substances is much used as a method for measuring the functional activity of the organ. In the present investigation, the foreign substances used were dyes, the object being to elucidate the manner in which the dye was taken up by the kidney from the blood passing through it. The proportion taken up is the extraction ratio. According to the Cushny theory, this depends solely on the percentage of blood filtered by the glomerulus ; according to the Heidenhain theory, it depends on the vital activity of the cells taking up the dye directly from the blood in the capillaries. The author discusses the dyes used and their general characters, along with methods of dye estimation in the body tissues and fluids.

Following the intravenous injection of the dyes into rabbits, the renal extraction ratio was ascertained in two ways :—(1) by comparison of the percentage of dyes in the blood in the renal artery and in a sample of this blood when it reaches the renal vein, and (2) by comparison of the total amounts of dye which reach the kidney by the artery and leave it by the vein in a given time.

The renal extraction ratio is different for various dyes and shows an inverse relationship to the renal circulation rate. In the case of two of the dyes studied, No. 90 and safranin, the renal extraction ratio at low circulation rates is practically 100 per cent. So complete a removal of the dye from the blood passing through the kidney is in direct opposition to the explanation offered by the Cushny theory for the accumulation of dyes in the kidney, as it would necessitate a filtration of all the plasma from the blood passing through the glomeruli. It follows that the cells of the convoluted tubules absorb the dyes directly from the blood in the intertubular capillaries. Within 40 seconds after the beginning of an intravenous injection of dye lasting 10 seconds, up to 20 per cent. of the quantity of dye injected may be deposited in the kidney. [The paper of Holton & Bensley, *supra*, should also be consulted.]

J. R. M. INNES.

Fish, E. W. (1931). **Age Changes in the Permeability of Dog's Enamel.**—*J. Physiol.* **72.** 321-326. [6 refs.]

The author [(1927). *Proc. R. Soc. Med.* **20.** (Sect. Odont.) 1.] had previously shown that dyes placed in the pulp cavity of a dog's tooth diffused across the dentine into the enamel and into the prism sheaths. The interprismatic substance and the prisms themselves were found to be entirely devoid of dye and appeared to be impermeable. The present paper gives the results of further investigations.

After drilling small holes in the dentine to expose the pulp, a trace of solid methylene blue was carried into the pulp tissue ; the hole was closed with cement and the dog was killed after 24 hours. To investigate the passage of the dye from the outside, cotton pledgets with methylene blue were kept in place on the surface of the tooth by means of metal caps and the dog was killed after 24 hours. The experiments were carried out with dogs of different ages and ground sections of the enamel were prepared after death.

In very young dogs, after 24 hours, the dye had permeated to the actual cuticle all round the tooth while, in old dogs, it was only present in patches reaching from one to two-thirds of the way across the enamel. By selecting dogs of different ages, it was possible, in the case of the dye placed on the surface of the enamel, to get a series of graduated results varying from penetration of the dye right through

the enamel into the dentine in very young dogs to an apparent absence of any penetration at all in old animals.

The fact that the enamel of young dogs is permeable to molecules of the size of methyl blue shows that there is a free fluid path across it from mouth to dentine. As age increases, the permeability becomes lost through some change in the surface layer of the enamel. The fact that the dye remains in the enamel for some time after it has once entered it indicates that the fluid path was not a very free one.

J. R. M. INNES.

TECHNIQUE.

CRACIUN, E.-C. (1931). Étude des milieux pour la culture de tissus *in vitro*. Préparation du plasma de poule par ponction cardiaque. [**Media for Tissue Cultures. Collecting Fowl Plasma by Heart Puncture**].—*C.R. Soc. Biol. Paris.* **106.** 987-989. 1 text fig. [3 refs.]

The author describes a simple method for obtaining hen plasma without sacrificing the bird. The hen having been placed on its back, the point of insertion for the needle is found on the left side 1 to 2 cm. from the protuberance on the sternum. After the skin has been rendered aseptic, the needle is inserted horizontally with a slightly forward movement, passing below the edge of the pectoral muscle and the rim of the sternum respectively. At a distance of 6 to 8 mm. from the surface, it enters the heart and 10 to 25 c.c. of arterial blood, according to the size of the bird, can then be withdrawn into a sterile syringe containing a solution of 1 per 1,000 heparin. The process can be repeated at intervals of a few days over an indefinite period.

R. E. GLOVER.

WYCKOFF, R. W. G., & TER LOUW, A. L. (1931). **Some Ultraviolet Photomicrographs of** *B. subtilis*.—*J. Exp. Med.* **54.** 449-451. 3 plates.

Ultraviolet photomicrographs have been taken of cultures of *B. subtilis* of varying age. The technique followed is briefly described. Since some proteins absorb in the ultraviolet more strongly than others, it is often possible to see detail in living and unstained cells by ultraviolet photography. This is well illustrated by the plates which show that young and rapidly growing cells contain no observable structures, but that older cells become granulated, the granulation increasing with the age of the cell. There is no indication of the presence of nuclei. The formation of spores can be followed from a fully sized body consisting of only faintly absorbing material to one differing only in that it is very strongly absorbing. There is no evidence of material or chromatin condensing from other parts of the cell to form the spore.

W. R. WOOLDRIDGE.

REPORTS.

COLONY AND PROTECTORATE OF KENYA. (1931). **Annual Report, Department of Agriculture.** [WOLFE, H.] 246 pp. Nairobi: Govt. Printer. [8vo.]

The report is made by the acting Director of Agriculture. It contains the

reports of the Chief Veterinary Officer and the Chief Veterinary Research Officer which are dealt with separately in this *Bulletin*.

Apart from the special expenditure of £44,075 for relief of the grain industry, £2,640 for maize drying plants, £5,635 for locust service and the grants for the veterinary services, the total budget of the department amounts to £77,878.

The cost of the veterinary services (executive division, £52,588 and research division, £37,632) was £90,220.

W. A. P.

COLONY AND PROTECTORATE OF KENYA. (1931). **Annual Report of the Chief Veterinary Research Officer for the Year 1930. [Kabete Laboratory.]** [WALKER, J.] *Ann. Rep. Dept. Agric.* Appendix III. pp. 95-189. Nairobi: Govt. Printer. [8vo.]

STAFF.—Mr. R. W. M. METTAM was transferred to Uganda on appointment as Veterinary Pathologist to that Protectorate. Dr. S. H. WHITWORTH was transferred to the Gold Coast as Veterinary Pathologist. Mr. W. B. C. DANKS was transferred from the post of Veterinary Officer to that of Veterinary Research Officer. Dr. E. A. LEWIS was appointed as Entomologist.

CLERICAL WORK.—Office work is heavy; apart from communications received and despatched in connection with specimens sent for diagnosis, over 5,000 letters were received and over 4,000 were despatched.

FINANCE.—£36,432 was expended. Apart from anti-rinderpest serum issued to the value of £20,267 (at Sh. 2 per 50 c.c.) and £552 received from the sale of surplus livestock, £14,993 of revenue was obtained from the sale of laboratory products.

LIVE STOCK.—131 horses, 12 mules, 1,548 cattle, 393 sheep, 6 goats and 112 pigs, as well as poultry and small laboratory animals, were used during the year.

808 Rhode Island Red cocks were received at the laboratory for immunisation against fowl typhoid and fowl pox prior to issue to native reserves.

TECHNICAL ROUTINE.—6,683 slides and specimens were received for diagnosis during the year.

LABORATORY PRODUCTS.—The preparation of a lesion-tissue extract for use as a "black-quarter" vaccine, introduced during the year, is described. The vaccine will now be issued regularly.

The following laboratory products were prepared during the year:—anthrax vaccine (1st and 2nd), 11,585 doses; "black quarter" vaccine (Kabete), 11,355 doses; "blue tongue" vaccine, 79,355 doses; colon bacillosis vaccine, 8,394 doses; contagious abortion vaccine, 2,518 doses; chicken pox vaccine, 4,527 doses; fowl typhoid vaccine, 14,934 doses; "horse sickness" vaccine, 1,001 doses; "Laikipia lung disease" vaccine, 12,050 doses; contagious bovine pleuro-pneumonia vaccine, 119,884 doses; paratyphoid vaccine, 3,400 doses; paratyphoid experimental feed vaccine, 855 doses; "redwater" and anaplasmosis vaccine, 211 doses; rinderpest vaccine, 35,045 doses; anti-rinderpest serum, 462,160 doses; sheep pox vaccine, 20,000 doses; trypan blue, bovine, 333 doses; trypan blue, canine, 151 doses; and wireworm remedy powder, 990,700 doses.

RESEARCH.—The bulk of the report is given to separate accounts of work on the following subjects, all of which will be dealt with separately in this *Bulletin*:—"East Coast Fever," by J. WALKER, pp. 100-108; Rinderpest by J. WALKER, pp. 108-113; Enzootic Hepatitis or "Rift Valley Fever" (an undescribed virus disease of sheep, cattle and man) by R. DAUBNEY and J. R. HUDSON, pp. 113-126 [see also this *Bulletin*. **1.** 291.]; "Nairobi Sheep Disease" by R. DAUBNEY and

J. R. Hudson, pp. 127-132 ; Contagious Pustular Stomatitis of Sheep by J. R. Hudson, pp. 132-133 ; Some Parasites of Dogs in Kenya by W. B. C. Danks, pp. 133-136 ; A Preliminary Note on Spirochætosis of Pigs in Kenya Colony by W. B. C. Danks, pp. 136-139 ; Observations on Vaccination of Young Chicks One to Eight Days Old against Fowl Pox by W. B. C. Danks, pp. 140-146 ; Coccidiosis in Birds by J. R. Hudson, pp. 146-149 ; Plant Poisoning by J. R. Hudson, pp. 149-150 ; Report on Tick Survey in Kenya Colony by E. Aneurin Lewis ; and on "Horse Sickness" (authorship not stated) pp. 163-189.

W. A. P.

Government of India. (1931). **Annual Administration Report of the Army Veterinary Service in India.** [Williams, A. J.] 33 pp. 6 tables. Simla : Govt. of India Press. [8vo.]

The bulk of the report consists of tables :—

Table 1 is a general statement showing the sickness and wastage.

Table 2 shows details of mortality and casting for diseases of animals in their various classes.

Table 3 gives the details of specific diseases amongst all military animals in India according to the branches of the service.

Table 4 relates to the health statistics according to the branches of the service.

Table 5 contains results of examinations of animal management classes held at the Army Veterinary Schools, Ambala and Poona, during 1929-30.

Table 6 gives a comparative statement showing the cost of maintenance of the Indian Army Veterinary Corps for the years 1928-29 and 1929-30.

Six pages are devoted to remarks on diseases concerning which figures are given in the tables.

The report should be consulted in original by those who require to ascertain details of the work done.

W. A. P.

Central Provinces & Berar. (1931). **Annual Report on the Working of the Civil Veterinary Department of the Central Provinces & Berar for the Year ending March 31st, 1930.** [Priston, W. H.]

The work of the department is dealt with under five heads :—veterinary instruction, treatment of diseases, breeding operations, establishment and general remarks ; it is also shown in tabular form in appendices. There is a chart showing the seasonal incidence of rinderpest, foot and mouth disease, hæmorrhagic septicæmia, "black quarter" and anthrax, also a coloured map giving the location of the veterinary staff, hospitals, dispensaries and centres of infection with rinderpest, hæmorrhagic septicæmia, black quarter and anthrax.

Two Indian students, residents in the Province, have been given scholarships in order to obtain veterinary qualifications in Great Britain. As the staff of the department has been below the sanctioned strength for several years, the local Government has sanctioned 15 annual scholarships tenable at the Bombay Veterinary College, in addition to the existing seven annual scholarships.

An officer of the department examined the students at the Nagpur Agricultural College in the diploma, intermediate university and B.Ag. courses.

Staff.—The Director of Veterinary Services has under his charge a Deputy Director, deputy superintendents [number not stated], 16 veterinary inspectors and 125 veterinary assistant surgeons.

FINANCE.—The three budget heads of superintendence, Rs.89,268 ; subordinate establishment, Rs.2,03,723 ; and hospitals and dispensaries Rs.1,54,939, make a total of Rs.4,47,930.

GENERAL.—Routine diagnosis of specimens was carried out independently by the deputy superintendents and also at the central laboratory at headquarters.

The year was a very unhealthy one for cattle : there were 16,884 outbreaks of contagious disease with a mortality of 46,041, an increase of 171 per cent. in outbreaks and of 16 per cent. in deaths in comparison with the previous year. Rs.1,32,826 were spent on vaccines and sera during the year. The advantages of the introduction of legislation making certain inoculations compulsory in the case of animals imported into the Province from some areas is discussed ; local conditions are, however, responsible for difficulties in this connection.

RINDERPEST.—" It was thought that this year would have been a healthy one so far as rinderpest was concerned, as the crest of the three and a half yearly wave seemed to have been reached in 1928-29. It is true the disease occurred only in a sporadic form in the interior and south of the Central Provinces, and in the whole of Berar. At the same time in the north (Jubbulpore division) west (Nerbudda division) and in Chhattisgarh division, there were successive outbreaks throughout the year.

" In almost all these outbreaks the source of contagion was traceable to animals imported from the neighbouring states, so that, although the province itself seemed to have passed the highest point of incidence, it appeared as though the time interval in the states was not the same as in the Province.

" This disease prevailed throughout the province and its virulence was most marked in the Chhattisgarh, Nagpur, Jubbulpore and Nerbudda Divisions. The highest number of outbreaks, namely 512, was reported from Saugor district. In the previous year there were 2,578 outbreaks and a mortality of 17,878. All of these outbreaks were attended to.

" The northern districts of the province suffered greatly in this respect owing to the main trade routes being situated in this area. Definite cases were reported, in which the efforts of the local staff to suppress a severe outbreak in one area had not been successful, owing to a batch of infected animals being brought in from outside the Province and sold in the district at much cheaper prices than the market rates."

There were 36,022 deaths in 4,432 outbreaks ; 251,338 animals in 1,918 outbreaks were given " serum alone " inoculation and only 178 of the inoculated animals died.

FOOT AND MOUTH DISEASE was widespread. In one instance, the veterinary assistant surgeon had been on tour in his area without a break for two months and had still been unable to visit 85 of the places from which reports of the existence of the disease had been received. There were 10,617 outbreaks with a mortality of 625 animals.

ANTHRAX occurred in all except one of the districts in the Province.

HÆMORRHAGIC SEPTICÆMIA prevailed in all districts. In localities where the disease shows an annual incidence, vaccine is used. " Serum-alone " is used when the disease is already in existence.

" BLACK QUARTER " occurred in all except two districts.

In 66 outbreaks, 6,281 animals were inoculated with serum alone ; in 96 outbreaks, aggressin and serum were inoculated simultaneously into 8,371 animals. In 136 villages where the disease occurs annually, 26,193 animals were given aggressin alone just before the monsoon.

PIROPLASMOSIS is enzootic in the cattle of the Province. Diagnosis was confirmed in 24,149 cases as compared with 29,275 during the previous year and 1,398, litres of trypan blue solution were used in the treatment of affected animals. Twelve cases of *B. gibsoni* infection were diagnosed ; treatment with tryparsamide yielded good results.

FOWL CHOLERA AND AVIAN SPIROCHÆTOSIS are prevalent.

BUILDINGS.—Owing to shortage of staff, no new hospitals or dispensaries were opened during the year, although they are required in certain places. No

less than 40 requests for the opening of new dispensaries were received during the year. The department has standard plans for the buildings and lay-out of these institutions and new ones are constructed according to the principles laid down in them. In some instances, the funds for the construction of hospitals and dispensaries are provided by public-spirited persons, an indication that the work of the department is appreciated.

Breeding Operations.—The officers of the department coöperate with those of the Agricultural Department in charge of cattle breeding farms. 69,453 castrations were carried out by the Burdizzo method in the Province.

Propaganda work is carried out by officers of the department at the regularly held cattle fairs ; lectures on the work of the department are given at these fairs and also at meetings of agricultural coöperative societies, held at different places. The senior officers are provided with projection lanterns for this purpose.

Central Provinces Veterinary Medical Association.—The sixth annual meeting was held during the year under the Presidency of the Home Member of the Central Provinces Government.

Appendices.—These show the results of the laboratory examination of the specimens sent for diagnosis ; the use of trypan blue ; the mileage travelled by the officers of the department ; details of contagious cattle disease reports received ; the results of preventive inoculation ; the number of animals treated by the itinerant staff and those treated at the hospitals and dispensaries ; the strength of the subordinate staff ; the returns of stud bulls in charge of the department ; particulars regarding cattle fairs and shows and the main details of the cost of the department.

W. A. P.

Fiji. (1931). **Annual Report by the Chief Veterinary Officer.** [Turbett, C. R.]—*Annual Report for the Year 1930, Department of Agriculture.* pp. 13-21. 3 tables. [f'cap,]

Staff.—Apart from the Senior Veterinary Officer, there are, one Government Veterinary Officer, a Stock Inspector and four native assistants.

Inspection.—The majority of the stock is owned by small Indian farmers, each herd consisting of just sufficient animals for the requirements of the family—a few cows and their calves, a stud bull, a pair of working bullocks and, possibly, a few horses and goats.

In the course of various tours, the veterinary officers inspected 32,638 cattle and 2,850 horses, besides goats and pigs, etc. In the case of the larger herds, the animals are inspected on the farms, but in the case of the smaller herds, the constabulary usually helps to arrange musters of the stock at various centres within a radius of two miles.

Legislation.—" The Regulations under the Foreign Animals Importation Ordinance were amended as follows :—

" (a) to provide for the importation of sheep, goats, dogs and cats from the United Kingdom and prescribing the period of quarantine ;

" (b) in respect of fees for upkeep and sustenance of imported animals whilst in quarantine ;

" (c) in respect of fees for dipping or spraying imported animals.

" Under the Contagious Diseases (Animals) Ordinance 1907 the following legislation was made :—

" (a) an Order in Council declaring infestation with ticks of the genus *Hæmaphysalis* to be an infectious disease under the meaning of the Ordinance ;

" (b) regulations defining the area infested with ticks of the genus *Hæmaphysalis* and governing the movement and treatment of animals within, into and out of the infected area."

Imperial Agricultural Bureaux.—In addition to being the official correspondent for Fiji of the Imperial Bureau of Animal Health, Mr. Turbett is also the correspondent for the Imperial Bureau of Animal Genetics.

Diseases of Animals.

The following list of the important diseases of the various species of animals given in the report is worth recording here :—

Diseases of Horses.—Sporotrichosis (" Fiji Sore ") and Strongylosis.

Diseases of Cattle.—Tuberculosis, contagious abortion, mammitis, " foot-rot," " white scour," " brand cancer " and lantana poisoning.

Diseases of Sheep.—" Foot-rot," shedding of wool and parasitism.

Diseases of Goats.—" Foot-rot " and parasitism.

Diseases of Pigs.—Tuberculosis and parasitism.

Diseases of Dogs.—" Stuttgart disease," eczema, mange, filariasis and intestinal parasitic infestation.

Diseases of Cats.—Infectious enteritis and mange.

Diseases of Poultry.—" Fowl typhoid " (clinical), botulism, favus, " blackhead " in turkeys, fowl pox, leg mange, de-pluming mite (*Cnemiodocoptes gallinæ*) and other forms of parasitism.

During the last few years the Senior Veterinary Officer has recorded the occurrence of the following parasites in Fiji :—

Horses.

Nematodes.—*Ascaris equorum, Oxyuris equi, Strongylus equinus, S. vulgaris* and *S. edentatus.*

Cestodes.—Anoplocephala.

Oestrid Larvæ.—*Gastrophilus nasalis.*

Cattle.

Nematodes.—*Hæmonchus contortus, Oesophagostomum radiatum, Dictyocaulus viviparus, Trichuris ovis, Ascaris vitulorum* and *Setaria labiatopapillosa.*

Trematodes.—*Paramphistomum cervi.*

Sheep and Goats.

Nematodes.—*Hæmonchus contortus, Ostertagia circumcincta* and *Trichuris ovis.*

Cestodes.—*Moniezia expansa.*

Oestrid Larvæ.—*Oestrus ovis* (only in imported sheep).

Pigs.

Nematodes.—*Hyostrongylus rubidus, Gnasthostoma hispidum, Crassisoma* sp. (*Globocephalus* sp.), *Oesophagostomum* sp., *Stephanurus dentatus, Metastrongylus apri* and *Trichuris suis.*

Dogs.

Nematodes.—*Toxocara canis, Dirofilaria immitis* and *Ancylostoma caninum.*

Cestodes.—*Dipylidium caninum.*

Cats.

Nematodes.—*Toxocara mystax, Ancylostoma braziliense.*

Cestodes.—*Dipylidium caninum.*

Fowls.

Nematodes.—*Ascaridia galli, Heterakis gallinæ, Acuaria nasuta, Syngamus trachea* and *Trichuris* sp.

Tuberculosis.—"A move was made to bring into force regulations designed to assist in the eradication of tuberculosis, by means of the tuberculin test, from registered dairies supplying milk to Suva."

The Existence of *Hæmaphysalis bispinosa*. This tick was observed for the first time in Fiji during the year and energetic measures were immediately taken to eradicate it before it obtained a strong footing. Imported cattle are quarantined and the system of inspection and dipping had been considered to be sufficient to safeguard against the importation of such a parasite : the manner of its entry into Fiji was not discovered.

Infestation with the tick was declared to be an infectious disease under the Fiji Contagious Diseases (Animals) Ordinance and that part of the island concerned was declared an " infected area " ; movements of animals into and out of the area were forbidden except under licence and control ; the cattle in the area were sprayed weekly.

At the same time poisoned baits were laid down to kill stray dogs and mongooses. " Total eradication is expected before the end of 1931."

Animal Husbandry.

The dairying industry, beef production, the supply of horses for agricultural purposes and sheep, goat, pig and poultry farming are discussed.

W. A. P.

Colony of Seychelles. (1931). **Annual Report of the Department of Agriculture for the Year 1930.** [Dupont, P. R.] Victoria, Mahé-Seychelles : Govt. Printing Office. [f'cap.]

There is brief mention [p. 14] of the fear of the introduction of contagious disease and of the need for veterinary advice. The authorities on the island, who are obviously nervous on account of the dangers involved and anxious to safeguard themselves, speak of the need for sending a suitable person to South Africa for a short time to obtain an elementary knowledge of veterinary work, a policy which may not yield the results that are desired.

W. A. P.

MISCELLANEOUS.

Hamer, W. (1931). **The Crux of Epidemiology.**—*Proc. Roy. Soc. Med.* **24.** 1425-1440. [14 refs.]

The periodic occurrence of epizootics has not yet received very close examination, possibly because the problem is hampered by difficulties which in some instances, are almost insuperable. The lack of statistics in practically all countries deprives the veterinary statistician of all data in respect of such diseases as influenza (" pink eye ") in horses and distemper in dogs, whilst official and independent action, such as prohibition, quarantine, stamping-out measures, serum-therapy and vaccination, plays an important part in checking or preventing the spread of infection in other diseases and so, by obstruction, obscures the normal course of their occurrence. As regards foot and mouth disease, the plurality of virus introduces a complication which would appear to make retrospective enquiry futile.

The epidemiology of human influenza is discussed in this article and special attention is given to the problem of " influenza in mufti " in other words, to the

aberrant forms of illness which the disease may assume in the periods between its pandemic phases. In this connection, the question of the relationship of " Malta fever " to influenza is raised and the author says :—

" The whole family of prevalences, with which germs of the Brucella group are associated, may, indeed, be deemed from an epidemiological point of view, to supply a long-felt want ; for they not only provide potential cases of ' influenza in mufti ' just where they are needed in the interpandemic troughs, but they may also help to link up epizootics (affecting cattle, pigs, dogs and perhaps other animals), with epidemics (in man), all alike regarded as part and parcel of the ' influenzas ' in the eighteenth and nineteenth centuries."

On the subject of psittacosis, referring to the large importation of parrots into Berlin where influenza was prevalent, the author asks :—

" Is there cause for surprise, then, if in such environmental conditions a few birds developed influenza ? " and, referring to the Ministry of Health's Medical Reports on undulant fever and psittacosis, suggests that " much as the hands may be the hands of ' undulant fever ' or ' psittacosis,' the voice is the voice of endemic influenza."

Whilst the transmissibility of influenza from man to parrot and *vice versa* may still be open to discussion, veterinarians will have no doubt as to the lack of evidence of association between epizootics among domestic animals and influenza in man.

D. A. E. C.

REVIEW.

KREUZ, A., & SPÄH, K. (1931). Wildpferde einst und jetzt. **[Wild Horses Past and Present]**. pp. 46. Numerous photographs and 1 map. Essen : Fredebeul & Koenen. RM 1·0.

This is an interesting booklet on the past history and present condition of wild horses which have been known on the continent of Europe. Five distinct races of wild ponies have been known in Westphalia since very early times, but only one now remains—the Merfelder Bruch pony which is maintained by the Duke of Croy. The herd, now about 135 strong, lives wild on a preserve extending to some 800 acres situated near the town of Dülmen in the government area of Münster, Westphalia. With the exception that breeding is controlled by an annual round up and dispersal of the colts to farmers and by the introduction of pure bred pony stallions, the herd is not interfered with. English ponies are preferred as stallions and, in 1931, two ponies were obtained from Lady Grey for this purpose.

The Merfelder Bruch ponies average 10 hands ; they are very hardy and make good workers.

J. T. E.